

# The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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## The Webb Compound Locomotive.

We present our readers this week with a carefully made engraving of the celebrated Webb compound locomotive, which has of late attracted so much attention in engineering circles. The engine is interesting, not only on account of the special features incorporated in its design and construction, but also because it embodies one of the first practical applications of the Joy valve gear.

There is no record of experiments to give a fixed value to the power absorbed by coupling two pairs of drivers together, but it has been held by many engineers, especially in England, to be an important item, and the original cost and the maintenance of the parallel rods are considerable matters.

As some dimensions of the Webb locomotive will undoubtedly interest many of our readers we append the following list:

## A Continuous Hoop Train.

The several attempts which have been made to roll hoops on a continuous train have hitherto been baffled by numerous practical difficulties, and success appears to have been beyond reach. Mr. Rees, of Pittsburgh, however, claims that he is now able to construct a continuous hoop train which will possess all the requirements essential to success, and is prepared to furnish a train of

roll 6. The first pass is made between the rolls 3 and 4, and as the metal passes out of these rolls it is pushed through the Gearing guide rolls, and by means of a repeating trough into or between rolls 4 and 5. This repeater is made adjustable, so that the blank enters 4 and 5 an instant before the last end leaves 3 and 4. When the blank passes through 4 and 5 it is pushed through the edging rolls and repeater into or between rolls 5 and 6, and thence taken to 2 and 3,

finish. When the hoops come from the continuous train they are permitted to cool a little so that the scale may rise. They are then placed in the bull-heads and scraped. From the bull-heads the hoops are run out in a straight line in a finished condition.

The hoop train may be run at 500 revolutions per minute, which will give an output of 1000 feet per minute, and, as the train is practically continuous, with proper heating capacity, 800 feet of hoop should be put out

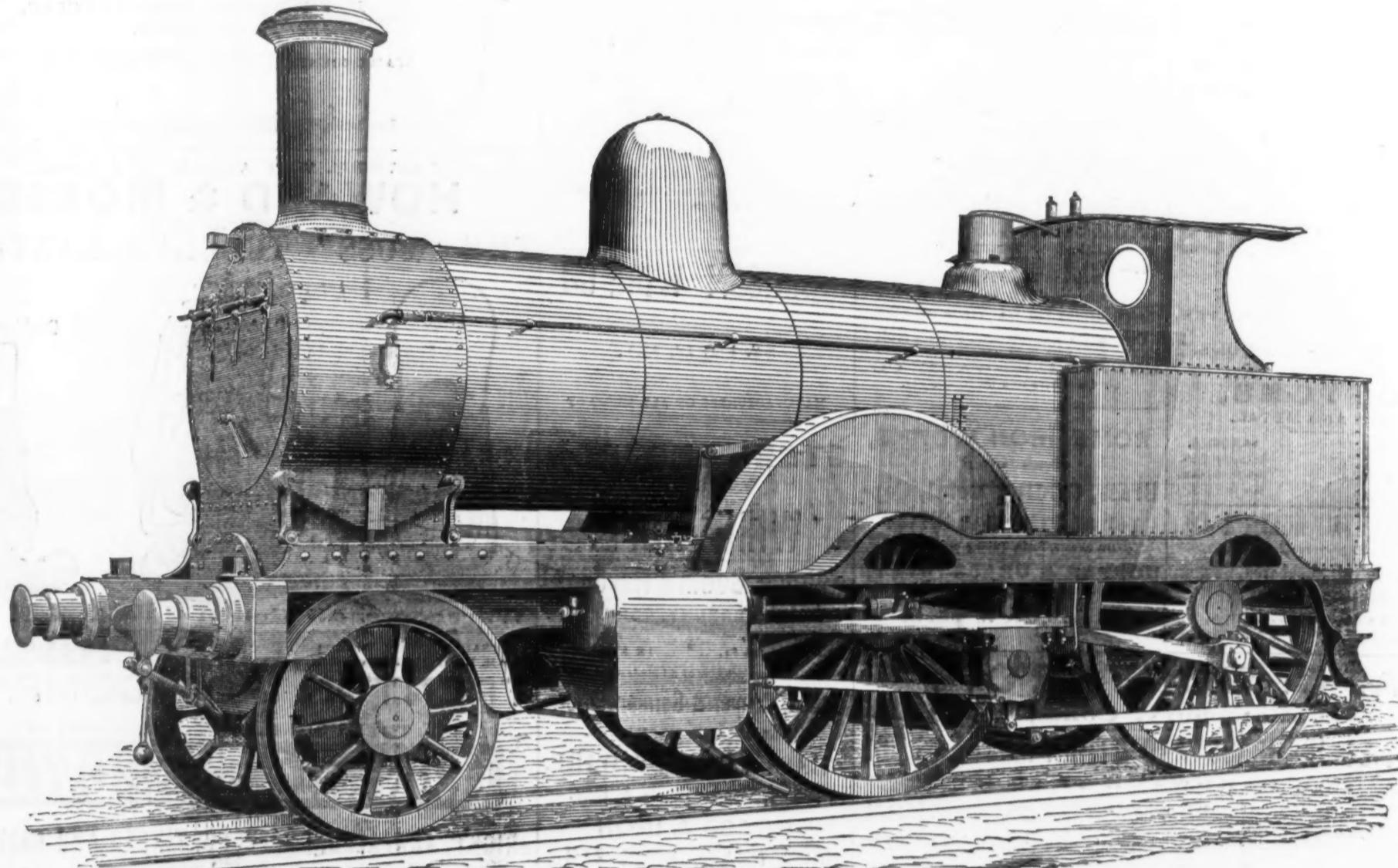


Fig. 1.—Perspective View—An Example Embodying Application of the Joy Valve Gear.

THE WEBB COMPOUND LOCOMOTIVE.

It is similar as regards boiler, wheels, &c., to the four-coupled express engines of the London and North Western Railway, England, differing from them, however, in several respects which were fully described in *The Iron Age* a short time since. Our recent account of the Joy valve gear, together with the illustrations in this number, will enable our readers to readily comprehend this important piece of engineering. The striking feature of the engine is that the drivers are not coupled, and the pair of outside connected high-pressure engines, which drive the back pair of driving wheels from one engine, are entirely separate and distinct from the single large low-pressure engine, which has its cylinder located under the smoke-box, and is connected solely to the forward pair of drivers. The only connection between the two engines is made by the rail and the exhaust, their valve motions being entirely independent of each other. The pair of outside cylinders are  $11\frac{1}{2} \times 24$  inches, and the single low-pressure cylinder is 26 inches diameter by 24 inches stroke. The exhaust from the high-pressure cylinders passes first into a gridiron pipe receiver between the frames, and then up through a horseshoe of copper piping in the smoke-box, where it is dried and heated previous to entering the steam chest of the low-pressure cylinder. There is sufficient room in the piping between the engines to make the possible changes in the relative crank positions a matter of no importance, so far as volume and pressure of steam in the reservoir are concerned. The boiler pressure is about 125 pounds, and the reservoir pressure about 50 pounds. Although the two pairs of drivers are not coupled, the fact that one engine receives steam from the other goes far to obviate danger of slipping. If the high-pressure slips, the result is to increase the reservoir pressure and give more capacity to the low-pressure engine; if the forward drivers slip, the effect is to reduce the reservoir pressure, and thus give more capacity to the high-pressure engines. It is said that in practice no difficulty whatever is experienced from the independence of the driving axles, and the elimination of the parallel rods is certainly a very important result.

High-pressure cylinders..... $11\frac{1}{2} \times 24$  in.  
Low-pressure cylinder..... $26 \times 24$  in.  
Diameter of front driving wheels..... $3 \text{ ft. } 6 \text{ in.}$   
Diameter of back driving wheels..... $3 \text{ ft. } 6 \text{ in.}$   
Distance between center of front and back driving wheels..... $8 \text{ ft. } 3 \text{ in.}$   
Distance between front driving wheels and leading wheels..... $9 \text{ ft. } 4 \text{ in.}$   
Length of boiler barrel..... $9 \text{ ft. } 10 \text{ in.}$   
Mean outside diameter of the same..... $1 \text{ ft. } 14 \text{ in.}$   
Length of tubes between tube sheets..... $10 \text{ ft. } 1 \text{ in.}$   
Outside diameter of tubes..... $1\frac{1}{8} \text{ in.}$

this kind, put it in operation and guarantee its work. The hoop train as proposed by him, consists of one pair of six-high 8-inch pinion housing, and one pair of six-high 8-inch roll housing, together with six pinions, six rolls properly mounted in their respective housings, spindles, and boxes connecting the pinions with the rolls, guides, repeating troughs, and the usual bullheads placed at a distance of about 50 feet from the train, and finally to 1 and 2, and from there run out in a straight direction to the bull-heads. The Gearing guide rolls are placed on the delivery side of each pair of rolls, so that the blank will be edge-rolled five times. When the rolls are placed in position Nos. 3 and 4 will be lined up for first pass, Nos. 4 and 5 for the second, Nos. 5 and 6 for the third, Nos. 2 and 3 for the fourth, and Nos. 1 and 2 for the fifth pass. No. 1 roll may be run by

per minute, which would be equal to 50 net tons of  $1 \times 1\frac{1}{16}$  hoop in 10 hours, or 100 tons in 20 hours. In practice this large amount of work could not be expected, but 50 tons per day of 20 hours of  $1 \times 1\frac{1}{16}$  is quite a moderate estimate of its production, and from 60 to 70 tons per day of oil barrel hoop, Mr. Rees says, can be made on this train, with proper heating capacity. It will be noticed that the blanks are rolled both on the lower and the upper faces of the rolls, except the top and the bottom rolls, by which means five passes are made with only six rolls. The advantages claimed for this hoop mill are: 1st, it dispenses with the rougher and catcher, and thus reduces the labor; 2d, it will produce double the amount of hoop of any mill now in use; 3d, the one set of rolls will make all sizes of hoops, thus dispensing with cost of changing for different widths and cost of different sizes of grooved rolls; 4th, the train is shorter and will occupy less room; 5th, the hoops will all be edge rolled, and but few hoops with ragged edges produced; 6th, the blanks will be finished better, will scale better, and produce hoops of a finer bluish surface. Additional information concerning the train will undoubtedly be gladly given by Mr. Rees.

Holland's locomotive has actually made a trial trip and drawn a train. The daily papers contain long accounts of the matter, devoted chiefly to Holland's theory of combustion and the chemical reactions which take place between the incandescent fuel and the steam. The trip was  $19\frac{1}{4}$  miles long, and the train arrived a minute and ten seconds ahead of schedule time, which, to the mind of any disinterested person, will show the immense advantage of Holland's engine and system of combustion over any other engine and combustion that has yet been built. Eighty-four gallons of oil were, according to Dr. Holland, used in this trip, the cost of which, according to the same authority, at  $2\frac{1}{2}$  cents a gallon, would be  $\$2.10$ , which proves that he is an able mathematician. The visible advantages to an outsider who does not comprehend the elaborate descriptions of what is taking place in the fire-box, is that there is an absence of dust and cinders.

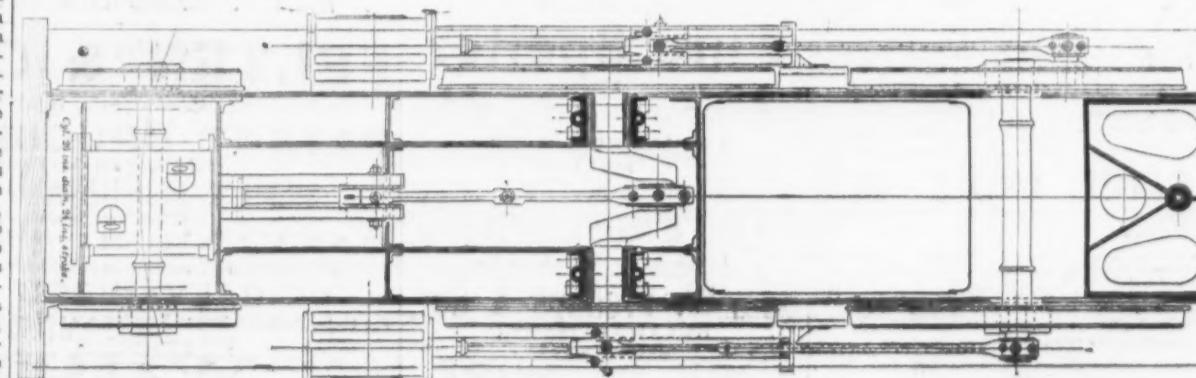


Fig. 2.—Ground Plan.

Number of tubes..... $168$   
Heating surface of tubes..... $380 \text{ sq. ft.}$   
Total heating surface..... $103.5 \text{ sq. ft.}$   
Area of fire-grate..... $19.1 \text{ ft.}$   
Weight in working order on leading wheels..... $13 \text{ tons.}$   
Weight on the back driving wheels..... $13 \text{ tons.}$   
Total weight in working order..... $26 \text{ tons.}$

Mr. Webb expects to derive important advantages from the system of construction referred to, claiming, in the first place, that he can obtain all the advantages of a coupled engine without its disadvantages (such as frictional resistance of coupling rods, &c.), and that by using the steam successively in two engines a great economy of fuel will

friction, if desired. All the other rolls are driven by spindles from the pinions. The main driving-power is attached to pinions on a line with roll No. 3. When the train is in working order the heater places the hot billet between rolls 3 and 4, when the blank is rolled on the flat and edged, and carried by the repeater into rolls 4 and 5. The same operation is performed in these rolls, as well as in 5 and 6, 3 and 4 and 1 and 2, being finally conducted by a straight trough to the bull-heads. The latter are so arranged as to permit the rolling of two hoops at once, for the reason that the continuous train, being automatic, will produce double the number of hoops that single pass bull-heads will

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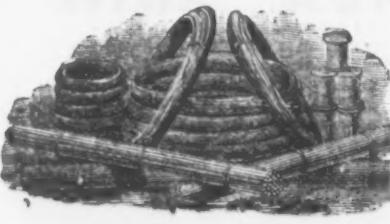
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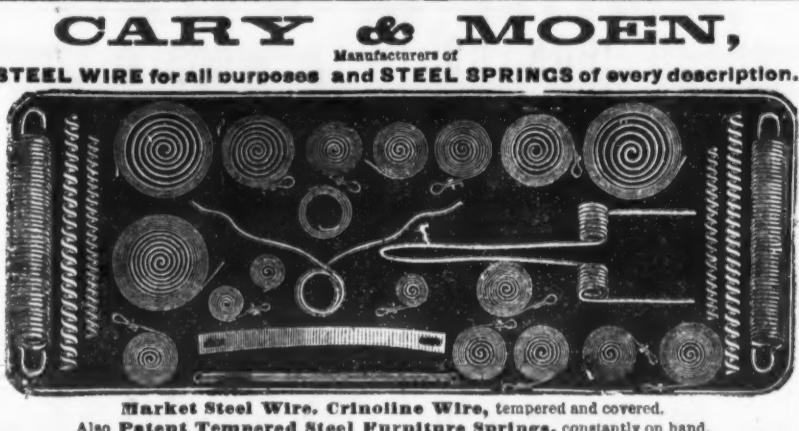
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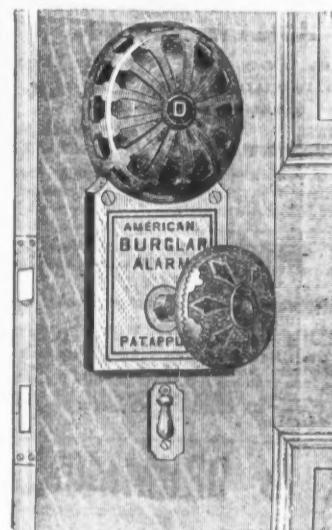
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#### Burglar Alarms.

The demand for a simple, cheap and safe protection of doors against unlawful visitors has long been felt by householders. A device designed to overcome the danger of sneak thieves and intruders generally is represented in the engraving below. It is a gong-hall so arranged as to be applied on the



Burglar Alarm for Attachment to an Ordinary Door Knob.

inside of a door, and to operate by means of the spindle of the ordinary lock. When placed upon a door in this manner, the latch or catch of the door cannot be moved without sounding the alarm. By slipping a lever provided for the purpose, the gong is silenced for the time being, allowing the door to be used without the constant alarm. By this means it will be seen that when the door is in use by the family, as in the daytime, the alarm need not be sounded, but on reversing the lever on retiring at night the alarm is fixed so as to make a noise whenever the knob of the lock is turned. It is so constructed that it will fit nearly every door, and what is an advantage for those who do not live in their own property, can be put on and taken off from a door without defacing it. It is quite desirable for sleeping apartments, making it practically impossible for a thief to enter a room without arousing the occupants. The article, which is manufactured by Messrs. Decker & Denning, No. 116 Washington street, Chicago, is handsomely finished in nickel plate, and may be considered an ornament to the door to which it is attached.

#### Some Disputed Points in Foundry Bookkeeping.

Some attention has lately been attracted to two questions in foundry bookkeeping which, while simple enough to a practical accountant, seem to have given rise to some discussion among stove manufacturers. They are:

1. To the debit of what account should "discounts" go, and are they not as much a part of the cost of stoves as iron or labor?

2. Should the cost of patterns and flasks be charged in separate account and carried as part of the assets, or charged directly to the expense account?

The latter part of the first question is the one item for consideration. Are not discounts as much a part of the cost of stoves as iron or labor? This question is one upon which experienced manufacturers may take opposite sides and argue with all sincerity the difference in their conclusions being for the most part dependent upon the standpoint from which the matter is viewed. The term "discounts" in the above connection we understand to mean the amount deducted from a selling price. It is quite customary in other lines of business as well as in the stove trade to sell goods at a certain price 30 days, 60 days, or even three months, with the understanding that 2 per cent., 5 per cent., or some other deduction will be made if cash is received within a certain specified number of days after date of invoice. The question which arises is, What is the nature of this deduction? Is it a part of the cost of the goods, or is it something of an entirely different nature? If it is a part of the cost of the goods, it evidently should be charged to some account representing the cost of production. In the simplest system of bookkeeping this would be directly to the debit of merchandise or manufactures, or whatever the general account is called representing the production of the establishment. If, however, this amount is not part of the cost of the goods produced, it does not belong there, but should be charged to some account representing the expense of conducting business, or to an account called by whatever name it may be which stands for the cost of use of capital.

If a certain lot of stoves when manufactured are worth absolutely \$1000 in the warehouse and are sold for that sum in cash, there being no discount or deduction, the question does not arise at all. If, again, they, being still worth \$1000, are sold for \$1000, with a discount of nominally 10 per cent., simply for the purpose of reducing the bill to a fair cash basis, the charge for the deduction evidently goes to the debit of the account which has received a credit in excess of what was right, in order to equalize matters. If, however, the goods being worth \$1000, cash, are put at \$1000, 2 per cent. off, in order to convert them into ready money because the concern wants capital, still another set of conditions must be taken into account. These several examples, it seems to us, throw enough light upon the subject to indicate the direction of a correct solution to the question.

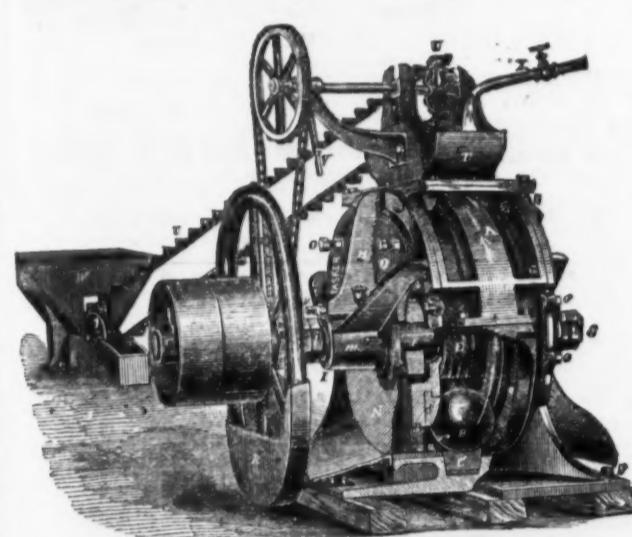
In considering each of these cases, we have based our calculations on the actual value of the goods in the market. Nothing has been said about cost of production, and we would remark parenthetically, that ordinarily the cost of production has very little influence upon the selling price of goods in the market. The question is, What can I get for my product? Then, How can I reduce my cost so as to sell it at market

rates and still make a profit? It is very seldom that the order of these questions is reversed, and that the calculations are made, first, as to the cost, and then as to a selling price based upon a definite percentage of advance upon cost. Given, a certain lot of goods ready for the market; they have a certain value dependent upon general market conditions. Any discount that is made from the price set upon them becomes, therefore, one of two things: It is an abatement to meet the market, or else a deduction to induce cash payment, because the cash is wanted. Therefore the account to be charged with the discount becomes either the merchandise account, not because the discount is a part of the cost of manufacture, but because the credit received by it was originally too great, and must be reduced to equalize things; or, it becomes a discount, or interest account, called by whatever name it may be, representing the price paid by the concern for the use of capital furnished by the purchaser of the goods.

There are other discounts entering into the business transactions of a stove founder, among which may be mentioned those in connection with the purchase of pig iron. It is customary to buy iron at a certain figure, four months, with the understanding that, if cash is paid, a discount will be made. We have already referred to this question in the columns of *The Metal Worker*, and have advanced the opinion that the difference between the cash value of the material bought and price paid for the four months was an interest charge. In other words, it was the sum which the concern was paying for the use of that much capital. It is recognized in the accounts of the most advanced concerns that everything must be reduced to a cash basis in order to obtain a common measure of comparison. Take, for example, life insurance, which probably embraces the most scientific system of accounts and values known at the present time. In it, it is customary to reduce everything to a cash basis, in order to present statements of results and actual conditions. In the question under consideration, we think the true solution to the problem will be found in estimating everything at a cash basis, and charging whatever difference there is between cash and the actual amount paid to an account which represents the use of capital. This rule is a broad one, and much might be said about it. There are, however, various side issues that arise. The final solution and the method adopted in any individual concern will depend very much upon the ability of the accountant or business manager to grasp some of the subtleties of business calculations. Books of accounts are, in a certain sense, indications of comparative results rather than absolute statements. For example, it makes very little difference to a proprietor at the end of the year, whose net profits, for example, have been \$20,000, whether the amount has been actually earned in the foundry, or whether a certain portion of it has been gained by judicious manipulation in the way of purchases and sales. On general principles, he will assume that careful management in the foundry has made some profit, and that careful business manipulation has not only taken care of that profit but added to it; but just how much has come from either source, if he be a man who manages upon general principles rather than specific details, he will care very little. We hold, however, that it is to the interest of every man to know just where he is gaining and where he is losing, and to be able to analyze his business in such a manner as to give particular attention to those departments that most need his supervision.

The second question proposed above—should the cost of patterns and flasks be charged in a separate account and carried as part of the assets of the concern or should they be charged directly to the expense account of the establishment—is very easy of answer. It depends entirely upon the facts of the case. At the end of a year's business do the flasks, patterns and follow-boards represent an actual value, or do they not? Have they been entirely superseded, or will they still be in use for the succeeding year's business? Probably, in the present state of trade, the middle ground is the safe one to pursue. The constant change in styles ordinarily wipes out the value of the patterns made each year. Whatever styles are produced this year are calculated for this year's business alone. Something else will be the leading style next year, and so it goes. However, the patterns which are produced this year will have some use in the business next year, and possibly the year following, even though they are not by any means leaders. The question of repairs—the odd plates that are to be furnished at some future time—must also be taken into consideration. The proper answer to the question therefore becomes very simple of statement. Let each year's business bear that proportion of the cost of patterns and flasks that properly belongs to it. Let a fair estimate be placed upon the patterns at the end of the year, and let the amount so determined be entered upon the inventory, the balance of the cost being borne by the current year's business. At best, this is only an estimate, and since estimates are always liable to error, it is well to err upon the safe side. Better make the value of the patterns and flasks remaining on hand too small than too large. In no sense can they be considered desirable assets in case the business is to be closed out. The value of patterns and flasks, to the extent of a very large percentage, whatever the estimated amount may be, depends upon the perpetuation of the business under the same management. It is, therefore, simply a question of accounts, partnership settlements, of a fair division of cost between one year's business and another, and the discriminating business manager will see the problem clearly in this light, and solve it accordingly.

**Malarial Foundations.**—The San Francisco *Bulletin*, commenting upon some of the foundations in existence in that city, makes the following statements: Many of our business houses and nearly the entire residence portion of our city are composed of wooden structures built on foundations of similar material. In a few years, floors begin to settle, cracks appear in walls, and owners, becoming alarmed, consult their architects, who, upon examination, pronounce the foun-



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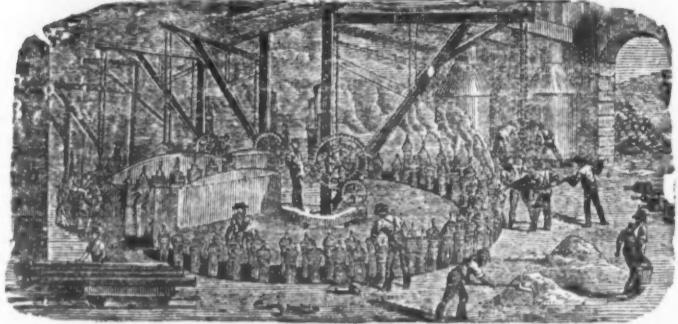
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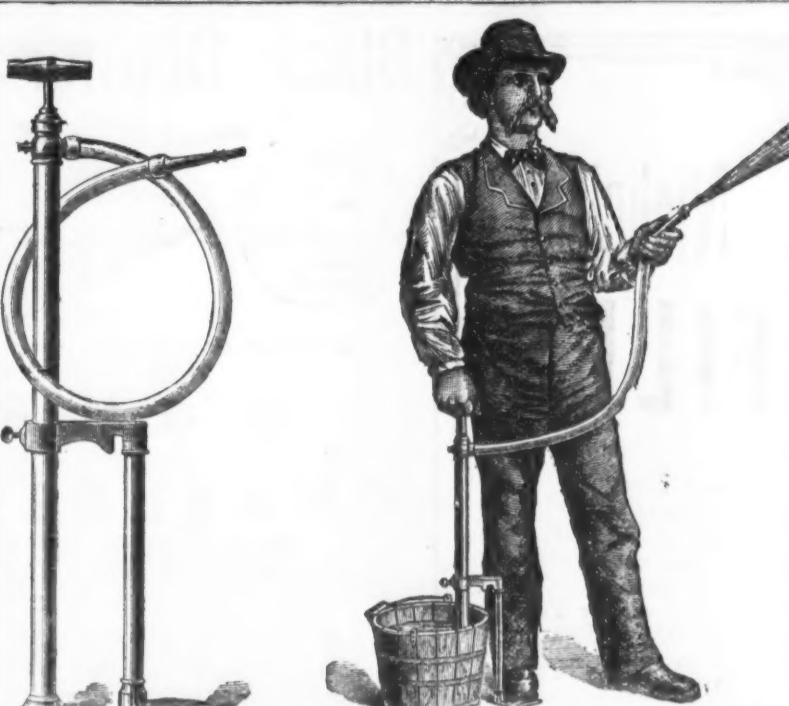
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that what I have given you will in some way help you in getting what you want. Please command me if I can answer any specific questions in the matter, and believe me, my dear sir, Yours truly,

COLEMAN SELLERS, of Phila.

Following his letter is another one from Mr. Edward S. Page, of the Cleveland Rolling Mill Co., who, in regard to this matter of wire gauges, says: "We have for the last 10 years been in the habit of using what is known as the 'American standard wire gauge,' by which we draw our wire and roll our sheet and plate. This gauge we know is used by a large proportion of American manufacturers, and although we do draw our wire to other gauges, which are specified as English gauges (the Birmingham gauge, Brown & Sharpe's gauge, and Stubbs' gauge), still we are in the habit of asking from our customers samples of what they require, showing the gauge. We would much prefer to have one gauge used by all consumers in this country, to be known as the 'American standard wire gauge,' but we know of no way, perhaps, by which this could be brought about, except through your association."

A quotation is then made from Miller, Metcalf & Parkin's Treatise on Gauges, in which a table is given showing the relative sizes, in decimals of an inch, of the London, Stubbs, and Brown & Sharpe gauges. One point here is to be noticed, in order to prevent people from being deceived in regard to tables of this kind. The dimensions of both the London and the Stubbs gauges are given to thousandths of an inch, from which it would seem that the exact sizes of each one of the different numbers is known. This is not, however, the case. These English gauges vary among themselves as much as they do from the American standard wire gauge of Brown & Sharpe, and it is not infrequent to find two of these from the same maker, supposed to be alike, differing from each other more than the difference between two successive numbers; the folly, therefore, of using them under any circumstances should be apparent to any one. When we consider the fact that the gauges do not meet the wants of the trade from a lack of numbers, the following extract is especially worth consideration:

"How is it possible for a roller to know just how many millions of an inch another man, whom he never saw, means when he says, No. 28 'full,' or No. 27 'easy'? And how is he to guess how many thousandths of an inch the other man's gauge is wrong in its make, or how many hundredths it has worn in years of steady use? This is no fancy sketch. The above are every-day difficulties in this age, when every man knows just what he wants and will have nothing else, and yet has no better way of telling his wants than to say, 'I want such a gauge tight,' when probably his gauge was from every other gauge that was ever made."

Mr. Briggs says in conclusion:

"I hope, Mr. President and gentlemen, that this matter will receive the consideration from this association that it deserves, and that you will honor yourselves by adopting a truly American standard gauge. And in view of that end, I most respectfully recommend for adoption the micrometer gauge made by the Brown & Sharpe Manufacturing Company, Providence, R. I. First, for accuracy in measurement; second, for ease of adjustment; and third, for its durability. It measures by the thousandths of an inch very accurately, is very simple in construction, and special sizes can be made, suitable for tool work, when so required."

New York Industries.

The census bulletin, which gives the statistics of manufactures in 20 principal cities of the Union, shows that New York is now the most important manufacturing city in the country. Though the capital invested in manufacturing enterprises in Philadelphia slightly exceeds New York figures, the amounts being \$170,495,191 and \$164,917,856 respectively, we employ 217,937 hands, against only 173,862 in Philadelphia. During the census year, from June 1, 1879, to May 31, 1880, a total of \$93,378,806 in wages was paid in this city, against \$60,606,287 in Philadelphia, and the value of the material used was \$275,009,236, yielding a manufactured product valued at \$448,209,248. Philadelphia in this case also occupies a lower rank, and it is found that in both cities a little more than 6 per cent. is added to the value of the raw material by the process of manufacture. Considered in respect to the amount of money employed, the business of making men's clothing stands at the head of the manufacturers of New York, the capital thus used being \$22,306,893. The number of hands employed in this branch of our manufactures is 47,650, and the value of the finished product \$60,708,697. Printing and publishing stands next, with a capital of \$14,774,029. These two are the only kinds of manufacture in which more than \$10,000,000 is invested. The greatest ratio of increase in value under manipulation of the material employed is in the case of steel engraving, the value of the material being made worth \$13,700 worth of material being worth \$218,305. The makers of artificial limbs give a value of \$44,620 to \$6056 worth of material. There are several other branches of manufacture, as the making of combs, of hosiery and knit goods, of instruments for scientific or professional use, and enameling, in which the ratio of increase in value far exceeds the average of the whole list taken together. For large value of the product in proportion to the number of hands employed, the drug and chemical business is conspicuous, the value given being \$3,604,178, and the number of hands 588. In cork cutting 11 establishments, employing 65 hands, turn out \$121,148 worth of the manufactured article, the material being more than doubled in value. The highest rate of wages paid is in steel engraving, the average yearly compensation being \$1010.

The number of male hands employed during the year in question was 140,111; of females above 15 years, 68,038; of children and youths, 3928. The employment of children under the age of 15 years in factories is obviously an evil, and it is gratifying to observe that in this respect we make a better showing than the city of Philadelphia, where 14,350 children and youths are thus employed, although the number of adults of both sexes in the factories of that city is 34,000 fewer than here. In some occupations the number of female hands exceeds that of male hands, as in the making of artificial flowers and feathers, of bags, bookbinding, paper-box making, on women's clothing, on men's furnishing goods, and a few others of a similar character. Among the plumbers and gas-fitters 1 woman and 118 children are reported. Silk and silk goods claim the largest number of children—1435. The next largest number employed is in paper-hangings, a manufacture which is reckoned among those dangerous to health. The cigar manufacturers employ 16,988 men, 9423 women and 478 children. In what may be called the artistic occupations of wood and steel engraving, hair work and photography, the number of women employed is about two-thirds that of the men. There are 4 establishments for the manufacture of oleomargarine, employing a capital of \$610,500, 248 male hands, using \$4,322,595 worth of material, and turning out a product valued at \$5,215,393. The average yearly earnings of the 217,937 men, women and children employed in the 11,162 manufacturing establishments of all kinds in the city are \$428.92.

Measurements of Water-Wheel Power.

Paper makers are not the only men who have been disappointed in the amount of power consumed by their machinery, when, by means of exact measurements, they have found out precisely what power is. Other manufacturers have been misled in this respect, sometimes to their great cost; but it may be that paper mills have been specially troubled because of the real difficulty of measuring the power of the wheels, by which, in years past, so large a proportion of them have been run.

Strictly speaking, the measurement of the actual discharge of a water-wheel is not a troublesome thing, when it can be set up in proper shape, for the express purpose of having the discharge measured, but when the wheel is in place, either alone or by the side of others in actual conditions of working, this measurement becomes a very different matter, and, in fact, quite impracticable; so, too, the attachment of a dynamometer to the wheel-shaft, or to some similar convenient part, involves so much trouble and so important an uncertainty in the interpretation of its results, that in practice it is never done.

The manufacturer is, therefore, left in the dark, except as he may be able to judge of his work by what he may have seen, or by what others tell him, of the measurement of the steam power needed to do similar, or perhaps, the same work, or to be more exact, what appears to be the same work, for appearances are, at times, extremely deceitful in such things. A wheel is called a sturdy running wheel, an unequalled developer of power, and sometimes by even more inexact names, when, in reality, the only thing known is that in doing such and such items of work, which may or may not be the same as those done elsewhere, a wheel may be wasting from leakage an important part of what is supposed to pass effectively through it, or there may be some unsuspected loss due to uneven wear below the limit of convenient examination and repair. In fact, a wide variety of causes renders it a very troublesome job to measure, and still more to estimate, the real effective power of a wheel when taken in the ordinary conditions of practice, as shown in the average water-power mill.

The only consideration that can be offered in explanation of so much apparent neglect is the fact that water-power is cheap, that it pays better to let the wheel alone as long as it does the work, rather than to lose the time and spend the money to examine it and to overhaul it if it were found in bad order. This may be a good plan for a water-wheel, but it would be rejected if offered to a mill owner as sufficient reason for failing or refusing to examine any other part of his business, so that he might know absolutely concerning it that it was right and in perfect order. The worst feature, probably, about this willingness to go blind is the serious chance which, in scores of cases, has proved a certainty that the wheel, or the department of the business, will be let run so long that when absolute failure or slackening of speed does occur, it is at the instant when every nerve of the establishment is strained to its utmost, and must be, to meet engagements, and when the inevitable loss due to the needful repair may become tenfold, or even more, what it need be if the time for examination and

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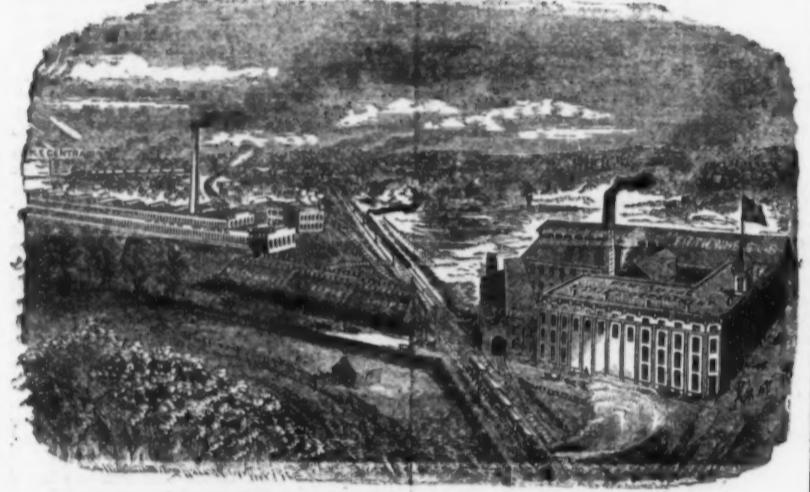
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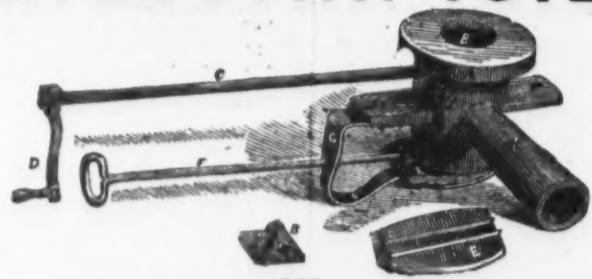
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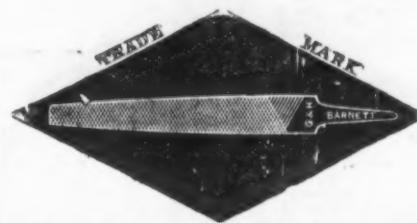
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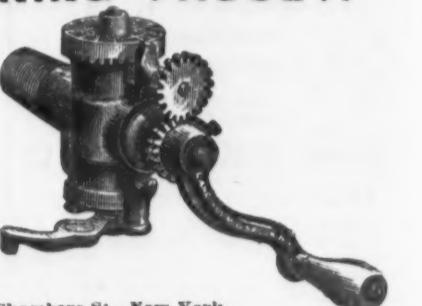
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p. m., when he needs to run until 6, and that he would be sure to provide steam-power to run by long before his storage areas had been so completely drained. While this may be true with many men, perhaps with most, it is still true that the suggestion is worth making to one man, or the two out of ten, whose wheels are in the very condition described, that of wasting during the day the water that would have run them during the last one or two hours.

Those manufacturers are fortunate, and the water-wheel builders are too, who have the opportunity to measure the power of their wheels by the ready transfer of their load to a good steam engine, to which have been fitted the simple fixtures for determining the load upon the engine at any required moment. These measurements of water-wheel loads have caused some surprises, as genuine and complete as have ever fallen to the lot of any builder of machinery, for their accuracy cannot be questioned, and they have been known to show that the wheels were rated, and were supposed to be running, to a horse-power far above that which the engine showed the load to be when transferred to it.

All these considerations show, or ought to show, to a thinking man, that comparisons should be diligently made of the work done by a water-wheel, not only as compared with another wheel which is believed to be doing the same work, but what is much more important, as compared with the absolute standard for that particular wheel in its own particular place. These things are not always easy to do, but the more difficult a task of this sort becomes the more certain it is apt to be that it ought to be undertaken at any probable cost.

### INDUSTRIAL ITEMS.

#### MAINE.

The Hardy Machine Company, Biddeford, manufacturers of card grinders and card grinding machinery, are doing a rushing business, and their business is double that of a year ago.

The rolling mills at Cape Elizabeth have resumed, and they have orders ahead that will keep them at work without interruption until Christmas.

#### MASSACHUSETTS.

The Cape Ann Forge Works, at Gloucester, W. N. Fisher agent and superintendent, and M. T. Denham, secretary, are doing a good business. The new hammer, put in a year ago, gives perfect satisfaction, and is a tool that was long needed by them. It is probably the best hammer in New England for medium-class forgings. They have many conveniences and appliances for handling heavy work, by which they save labor and lessen the price of work.

The addition to the American Tack Co.'s factory, at Fairhaven, has been commenced. It is to be of stone, 90 x 36 feet, and three stories high.

The Whitehead & Atherton Machine Company, of Lowell, have been obliged to run their works nights in order to meet the growing demand for their patent cards.

The Athol Machine Company have chosen these directors: G. T. Johnson (president), Caleb T. Spear, A. Bangs, W. D. Smith, A. W. Goodman, S. H. Bellows, D. A. Newton (secretary and treasurer). The company are preparing to build their new brick foundry, which will be 90 x 45 feet, with an L 60 x 25 feet, and contain annealing, pickling, tumbling and grinding rooms.

At Uxbridge the committee chosen to look into the patent machine and screw of E. Wilder, of Boston, for which there has been some talk of building a shop here, report favorably, and \$75,000 has already been subscribed of the \$200,000 wanted to begin with. It is the intention if the project is successful to erect a large shop.

The new improved engine lathe made by Goddard, Shaw & Co., Brockton, has many new and valuable features worthy of the notice of machinists. It is a very heavy lathe, which with a 7-foot bed weighs 1800 pounds, and carrying 3-inch belt, and with 17-inch swing. The back gears are located under the head stock, and consequently out of the way in working the lathe, and with no danger of accidents to the operator. The advantage of this arrangement of the gears is that the lathe will turn a heavier chip without trembling than lathes with the back gear in the usual place. The lead screw is entirely covered up on the inside of the lathe bed, and is thus protected from chips and dirt, and the nut coming near the center of the carriage makes a more direct pull than in any other position. The tail stock is secured to the bed by the adjustment of a cam, which is simple and effective, and is easily set over by means of one screw.—*Commercial Bulletin.*

#### PENNSYLVANIA.

An accident occurred to the blowing engine at Monocacy Furnace some days ago which is quite serious, although it will not cause a blow-out. The piston broke, and as the engine made a revolution, it broke a piece out of the cylinder, and also cracked the cylinder head. The furnace will be kept running by the use of one engine until the repairs are made.

The Ward Axle, Brake and Coupling Company have taken formal possession of the property on Railroad street, in Monongahela City, lately purchased by the company. The company expect to turn out work by the middle of August.

Application is to be made to the Governor for the charter of an intended corporation, the Allentown Rolling Mills, the character and object whereof is the manufacture of iron and steel, or both, or of any other metal, or of any other article of commerce from metal or wood, or both. This is probably the company that will operate the mills of the late Allentown Rolling Mill Company.

Fairchance Furnace, Fayette County, is idle.

#### PITTSBURGH AND VICINITY.

The United States Iron and Tin Plate Co. has fallen into the hands of the sheriff. The reason for this was the foreclosing of two mortgages by the holder, Mr. J. H. Demmler, who is also president of the company. Mr. Demmler had lent the company money when financial embarrassment, caused by

the tariff duties on tin, had almost broken it up. The company never fully got on its feet after its first reverses, and of late has been unable to keep up to Mr. Demmler's terms, and the shut down occasioned by the strike has been disastrous to them. In this state of affairs Mr. Demmler deemed it best to foreclose. The company is a stock concern with \$75,000 worth of stock. It is expected that all of this will be lost. In addition to the \$110,000 due to Mr. Demmler, the company owes about \$40,000, almost all of which is for iron and other material furnished. Notes have been given for most of this debt, and they will be paid by the company when they mature. The assets are estimated as being worth from \$115,000 to \$125,000. It is more than probable that Mr. Demmler will buy in the property at Sheriff's sale. Since the first of June the works have been thoroughly repaired, and they are ready to start up full as soon as the strike ends.

Geo. Duncan & Sons are busy on the foundations of their new furnace. They are also doing repairs about the factory, and will set pots in the old furnace on August 1. This furnace has now been in continuous use for two years and is in first-class order every way. Their new set, No. 600, is just out, and is sure to meet with a favorable reception from the trade. The shape is novel, and it is embellished in rich and ornate designs. They will have another set (round) ready in a few days.

The repairs being about completed at W. D. Wood & Co.'s mill, McKeesport, work will be resumed with non-union men, as usual.

The Pittsburgh Smelting Co., established the first of April last, make a specialty of blast furnace and rolling mill work, house fronts, &c. They have met with good success, and now give employment to 40 hands. They are having a good run on hammer dies, ingot molds, and all kinds of anti-friction metal work. Mr. N. A. Didier, the manager, has had twenty years' practical experience in business in France, having come from there to this city one year ago. Mr. H. L. Shaffer, secretary and treasurer, is a native of this city. There are two buildings occupied, one 100 x 160, brick, two stories, and the other 80 x 150, two stories, brick. The Company are making large additions, to go extensively into the house-front business. Office and works, corner 13th and Pike streets.

Geo. A. Macbeth & Co. are running both their furnaces at present, their new one being in successful operation. The chimney trade has not opened up yet, but will be very brisk from present appearances.

#### WEST VIRGINIA.

Mr. J. F. Lewis, of Quinnimont Furnace, writes us, in correction of an item which recently appeared in these columns, to the effect that his furnace would soon blow out. He says that this is incorrect. The change they have lately made is that of shutting down on Sundays. The furnace is doing well.

#### OHIO.

A company has proposed to establish a glass tableware works at Massillon, which will at the start employ 125 hands, if the people of that city will donate to the company a site and \$6000 in cash. It is thought the proposition will be accepted.

The Morse Bridge Works, Youngstown, are running extra time on their contract with the Connellsville extension of the Pittsburgh and Lake Erie.

The Akron Machine Works of Messrs. Taplin, Rice & Co., of Akron, manufacturers of steam engines, mill gearings and heating and cooking stoves, &c., which was established in 1871, and subsequently incorporated in 1871, have recently replaced two cupolas, put in a new blower, built an addition to their buildings and made several other improvements. The main works now occupy two lots, one 200 x 300 feet, the other 120 x 180 feet.

The Lane & Woodworth Glass Roofing Works, Youngstown, have closed down for the season, as is the custom of all glass works during the hot months of July and August. During the stoppage it is intended to reline the tank, repair the ovens, erect a packing house, and make a number of smaller repairs that have become necessary.

The Co-operative Glass Company, at Ravenna, which was dissolved some time ago, has been reorganized and the works will start up next week. Sixteen of the members retired, and William Haley, a foundryman of Ravenna, was taken into the firm. He put \$4000 into the business. Tony Snyder, one of the proprietors of the Acme Glass Factory in Steubenville, was also taken into the firm. He put in \$5000.

The Phoenix Furnace of Brown, Bonnell & Co., near Youngstown, is being thoroughly repaired and put in shape for another five years' run. A new hearth is being constructed, and it is the intention to put a new hoisting engine in.

The Barney & Smith Mfg. Co., Dayton, are actively engaged in the construction of passenger and freight cars, from three to four months' orders from old contracts having yet to be filled. They have just received a new steam hammer and are employing 1200 men.

#### ILLINOIS.

A new corporation, called the McKinney Tubular Rail Company, has just been chartered, at Springfield, by David Carr Aldrich and other Chicago capitalists. The capital stock is \$1,000,000.

The Bergen Tool Company is the name of a lately organized concern at Batavia for the manufacture of all kinds of fine tools and machinery for special work. This company has recently purchased ground, erected substantial shops thereon, and equipped the same with new machinery and tools suitable for the prosecution of their business. H. M. Wade is president, Wm. H. Burnham, secretary and treasurer, W. D. Turner vice-president, and Wm. L. Bergen superintendent. Charles H. Besley, 175 Lake street, Chicago, is business manager.

The Elgin Electric Tower Company, with a capital of \$100,000, has for some time been engaged in manufacturing tubular iron towers for electric lighting. The Bruah Company uses these exclusively.

The Elgin Watch Factory employs 1610 hands, ships 590 watches to Chicago every day; its pay roll is \$68,400 per month, and

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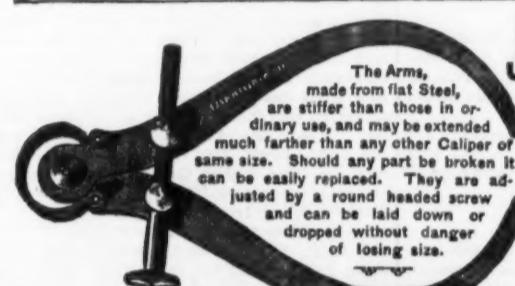
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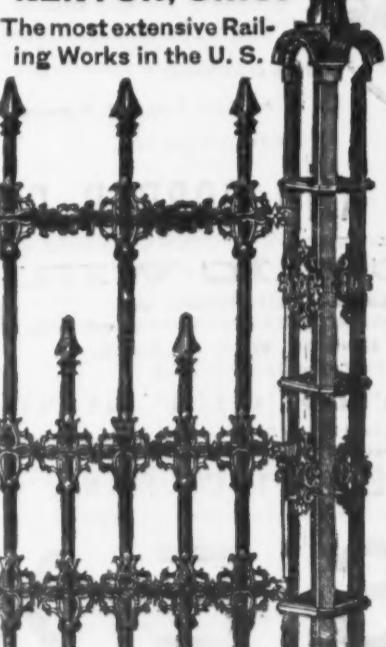
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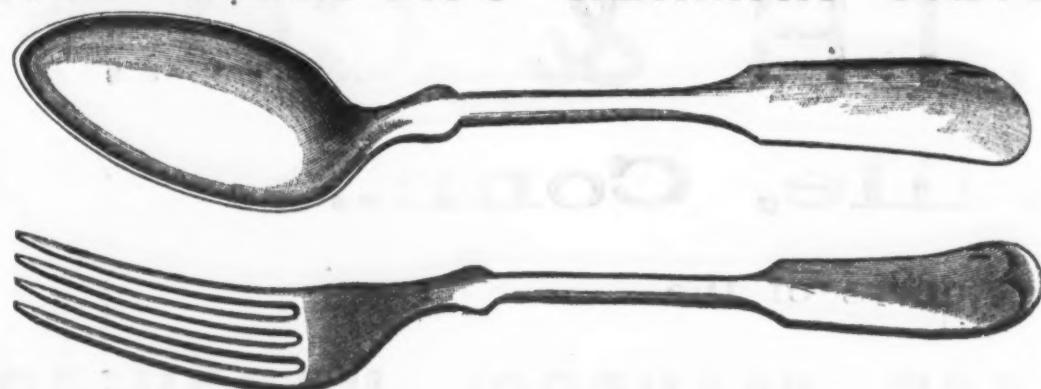
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the number of hands will shortly be increased to 2000.

Within the past four weeks the Thorn Wire Hedge Company, Chicago, have added to their establishment 15 more barb wire machines.

The Elgin Moseley Lathe Works employ 30 men manufacturing watchmakers' lathes and attachments. The output of these works has doubled during the last two years.

The Chicago Steam Boiler Works have recently increased their working force to 100 men, and have contracts on hand for building to boilers for firms in various portions of the country. The Schenck Iron Foundry, in connection with the first named establishment, reports trade good.

The Illinois Iron and Bolt Company's factory, Carpentersville, manufactures thimbles, skeins, letter presses, sad irons, and blacksmiths' tools. It annually consumes from 8000 to 9000 tons of iron, employs 160 hands, whose wages amount to \$60,000 a year, and their products aggregate \$350,000.

The Chicago Die and Machine Works have just finished for use a number of improved car-wheel grinding machines, which, in their construction, differ from those already in use. The establishment is also building several barb wire machines of a new pattern, and report trade good.

The engines and boilers for the Northwestern Horse Nail Co.'s Works at Brighton are ready to place, but the building is progressing slowly on account of the scarcity of brick. This company have erected a temporary machine shop on the grounds, and are building 25 forging and about 20 finishing machines to be used in the works. The building will probably go rapidly forward to completion after this week, as the contractors have agreed to deliver eight car-loads of brick per day.

The Gates and Scoville Iron Works, Chicago, will hereafter be known as the Gates Iron Works.

## MISSOURI.

On account of having to make room for the erection of their new machinery, including an engine, the Missouri Wire Fence Company, St. Louis, are running only about half of their works.

The South St. Louis Iron Works have put in a new lathe and a screw cutter, and will, in a few days, put in a new planer and a 6 x 12 engine.

The Standard Tool Company, St. Louis, who shut down their works on the 28th of June to make necessary repairs, will start them up in a few days.

## MICHIGAN.

The following table exhibits, in gross tons, the total lake shipments of iron ore from upper peninsula ports the present season, up to and including July 19, together with the amount shipped during a corresponding period last year:

Name of port.	1881.	1882.
Escanaba	550,512	705,720
Marquette	2,6,136	442,078
L'Anse	29,500	21,9
St. Ignace	—	24,73
Total	81,147	1,276,135

Showing an increase of 461,988 tons.—  
Marquette Mining Journal.

## The Center of Population.

A volume recently issued from the Census Office, embracing a portion of the statistics gathered at the enumeration of 1880, contains among many valuable maps illustrating the distribution, density and character of population, a diagram which shows how the center of population has shifted from decade to decade since 1790, in its steady march westward. What statisticians understand by the term center of population, it may be well to explain, is the point at which equilibrium would be reached were the country taken as a plane surface without weight, but capable of sustaining weight, and the inhabitants distributed over it in number and position as they are found at the period under consideration, on each inhabitant being supposed to be of equal weight, and consequently to exert pressure on the pivotal point in direct proportion to his distance therefrom. The first census of the United States, taken in 1790, showed the center of population to be on the eastern shore of Maryland, about 22 miles from Baltimore, and near the 39th parallel of latitude. From that point it has moved westward at the average rate of about 51 miles in a decade, never deviating as much as a degree to the north or south of the 39th parallel. By 1800 it was moved 41 miles, and was found at a point 18 miles west of Baltimore. In 1810 it was near the Potomac in Virginia, at a place 40 miles northwest of Washington, having traveled 36 miles during the preceding decade. Its progress in the following 10 years was 50 miles, and in 1820 it was in the valley of Virginia, 16 miles north of Woodstock.

The census of 1830 discovered that the center of population, previously a little north of the 39th parallel, had passed that line and was a trifle to the south of it, at a point in the Allegheny Mountains 19 miles west of Moorfield, Va., the progress westward since 1820 being 39 miles. This was the most decided southward movement it has made in any decade, and is explained by the acquisition of Florida and the settlement of Alabama, Mississippi, Louisiana and Arkansas. In the ensuing decade the center recrossed the 39th parallel, moved 55 miles westward, and was found at a point 16 miles south of Carkshurg, Va. Southern Michigan and Wisconsin and Northern Indiana and Illinois had begun to fill up, and their population turned the balance to the northward. In 1850 it was still in Virginia, but close to the Ohio River, having moved 55 miles, and being at a point 23 miles southeast of Parkersburg. Again it was south of the 39th parallel, but only a distance of about a mile, the deflection being explained by the annexation of Texas. By 1860 it had reached a point 20 miles south of Chillicothe, Ohio, and a little north of the 39th parallel, having made the greatest progress ever made in a decade, the distance from the last point being 81 miles. This remarkable movement was caused by the settlement of the Pacific coast—12 persons in San Francisco, by reason of their distance from the pivotal point, counterbalancing 40 persons in Boston. The next

step was 42 miles westward and about 12 northward, which brought the center into Highland County, Ohio, about 48 miles east by north of Cincinnati. It is believed that the apparent northern movement during this decade was caused by a defective enumeration of the colored population of the Southern States at the census of 1870. In 1880 the center was near the village of Taylorsville, Ky., about 8 miles west by south of Cincinnati, the westward progress being 58 miles and the deflection to the south about 8. The census of 1890 will probably discover it in Jennings County, in Southeastern Indiana.

If there is no great change in the rate of Western movement of population, the central point, still traveling, as it doubtless will, on a line closely corresponding to the 39th parallel of latitude, will not cross the Mississippi River until 1850, when it will be found not far from the mouth of the Missouri. It is not improbable, however, that it will never reach that stream, but will remain nearly stationary somewhere in Southern Illinois. There are large areas of country in the far West unfit for habitation, save where deposits of the precious metals are found, and other considerable areas where grazing, which supports but a scanty population, will always be the chief industry. The increase of population in the trans-Mississippi region may not, therefore, much more than counterbalance the increase in the older-settled portion of the country after the close of the present century. In estimating the changes and progress of the future, we must not forget that, marvelous as is the growth of the new West, it is only a little more rapid than that of the great middle region between the Hudson and the Mississippi. The State of New York, it must be remembered, added 700,000 to her population between 1870 and 1880, Pennsylvania 460,000, and Ohio 522,000. The increase in each of these old States would make a Western State as populous as Nebraska.

## Coal and Coke in Pittsburgh.

The bituminous coal field of Pennsylvania, which underlies a large portion of the State from which the manufacturing establishments of Pittsburgh draw their vast supplies, is estimated to contain about 14,000 square miles. The mere matter of area, however, can not be considered as a measure of the value of a coal deposit, its essential elements being quality, thickness, regularity of its accessible veins and cheapness and facilities of transportation to market. During the census year ending with June 30th, 1880, the quantity of coal produced in the United States amounted to 42,417,764 tons, of which the three counties of Westmoreland, Allegheny and Fayette, which are largely dominated by Pittsburgh's capital and energy, produced the following amounts:

Allegheny	4,425,872
Westmoreland	3,227,300
Fayette	2,318,788

Total tons 10,962,960

The above figures represent 25 per cent. of the entire quantity turned out, and about 1,300,000 tons were shipped by rail almost exclusively for use in the manufacture of illuminating gas, and 1,000,000 tons were consumed in Pittsburgh for gas manufacturing and domestic purposes. In this connection the following figures are given:

Capital invested	\$15,552,000
Hands employed	17,069
Value of product	\$1,205,306
Amount of product (tons)	7,726,776

At the very gates of Pittsburgh and tributary to its commerce are located the interesting and highly productive coke-making regions of Western Pennsylvania. This district, like the oil regions, cannot be duplicated in the world. The sole product of this area is coke, a commercial fuel which is greatly sought by iron founders and smelters from Lake Champlain and New York on the East to the Salt Lake and Omaha on the West, and from Canada to the Gulf of Mexico. Coke is the product of slow combustion applied to the chief mineral of this region. The coal is a well-defined portion of the Pittsburgh coal basin, the vein varying in thickness from 8 to 12 feet, and worked at all depths below the surface down to 300 feet. The entire deposit of coal lies to the southeast of Pittsburgh, and varies in width from 2 to 12 miles, with a length of 40 miles, the northern end of the basin or deposit being near the town of Latrobe, and its southwestern limit extending into the State of West Virginia. The extent and character of the industry may be readily imagined by an inspection of the annexed figures:

Capital invested	\$10,854,000
Hands employed	5,659
Value of product	\$4,423,512
Amount of product (tons)	2,760,037

## Ready-Made Houses.

At different times we have had occasion to answer inquiries from correspondents with regard to ready-made buildings. Accordingly we take pleasure in directing their attention to a catalogue of house plans, with details and descriptions, adapted to temperate and tropical climates, recently issued by the New York and Flushing Building Co. The illustrations in this book represent buildings constructed by this company for local and export markets. The post office address of the company is Flushing, N. Y. Portable houses made by this company are constructed under patents controlled by it, and are first erected at the factory, each piece being marked in position, so as to identify it when the building is put up at its destination. A drawing representing the building is similarly marked, by which means unskilled labor is able to put up the buildings wherever required. The catalogue embraces houses ranging in size from a single room 9 by 12 feet, to houses two stories high, with 9 and 10 rooms, halls, &c. Houses of a single story, with veranda on all sides covered by the main roof, containing 10 rooms, are also made. Besides dwelling houses, various outbuildings are also made by this company on the same general plan. Churches are also prepared. This catalogue is calculated to meet the wants of all who are interested in the subject of portable houses, and it answers many questions which continually arise with reference to a subject of this kind. In addition to the designs already referred to a

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Three years in these technical schools constitute a course of training, and one of the directors asserts that his pupils hold the leading situations in the large manufacturing establishments in France. This system of technical education is, no doubt, a costly one, but the French taxpayer does not grumble. He recognizes the importance of educating the artisan and of developing the resources of the country, and this, he thinks, can be done to a great extent through the technical schools.

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# The Iron Age

AND  
Metallurgical Review.

New York, Thursday, July 27, 1882.

DAVID WILLIAMS *Publisher and Proprietor.*  
JAMES C. BAYLES *Editor.*  
JOHN S. KING *Business Manager.*

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### The Labor Situation West.

There has been but little change in the strike at the iron mills West since our last report, and it is doubtful if there will be any material change until after the meeting of the National Lodge of the Amalgamated Association, which convenes in Chicago August 1st. Both sides seem waiting for this meeting; the workmen to see from its actions what is the opinion of the association at large as to the strike, and from this to judge what their course shall be. It is already an open secret that at this convention a decided effort will be made, by no inconsiderable number of the delegates, to adopt some measures that will lead to an ending of the strike. As we have so often stated, there is no question of the fact that a large number of the members of the association believe that the strike was premature and unwise, and this element will make itself felt. Certain action that the Association may take will reveal to outsiders at once how strong and influential this element is, and will give some indications as to the probable course of the association. It is stated that a meeting of prominent members of the association was held at Pittsburgh last week, at which this point of a settlement was discussed. None of those present would give the slightest clew to what had been done, the uniform reply being that matters had been considered in which the public had no interest. It was stated by outsiders, who professed to know, however, that it had been decided to urge, at the meeting of the National Convention in Chicago next month, that measures be taken to reconcile the differences between the manufacturers and workingmen. How true this report is we do not know, but there is no doubt of the fact that this convention at Chicago will have an important influence on the strike, either one way or the other.

On the other hand, the manufacturers are waiting for this convention in order to determine from the result of its action what their future course shall be. Up to the present their course has been a passive one. The state of trade has been such that they have been content to let matters drift along, making no effort to put their mills in operation. Should the present dullness continue they will feel no inclination to change their course of action, and should the outcome of the convention at Chicago be such as to lead them to suppose that the opinions of those who have not been favorable to the strike have prevailed, then there will doubtless be a continuance, for a little at least, of the present policy of inaction; but should the outcome be such as to indicate a long continuance of the struggle for an advance, then it will be for the manufacturers to decide what course they will pursue. It surely cannot be supposed, even by the most sanguine members of the Amalgamated Association, that this policy of inaction will be continued indefinitely. They know that already there are some manufacturers who do not regard the Amalgamated Association in the same favorable light that the majority do, and they know that these manufacturers have tried to convince the others that the union has not been so beneficial as has been believed, and a long continuance of the strike may be an effective argument that may lead to a change in this policy of inaction.

Just what the policy of the convention will be it is of course impossible to tell. We repeat that very many of the better men in the association believed the strike was unwise and ill-timed. They believed that the condition of trade would not help them, and knew that the condition of the treasury of the Amalgamated was not such as to stand a long strike. Those who argued that the manufacturers would give in in two weeks or four at the most, and that the demand upon the treasury would not be great, have found out their mistake. It is now beginning the eighth week of the strike, and there are no signs of surrender on the part of the manufacturers of Pittsburgh, Wheeling, the valleys and Cleveland. Five weeks' strike, or, \$30 a man, is now due and how much has been paid? Even the desperate efforts to get the mills west of Pittsburgh and the other points named above to work in order to bring in revenue, while they have succeeded, have not relieved the treasury much and the feeling of discontent is growing on the part of those districts that have paid large sums of money for years past into the treasury, and now in their need do not get back. This feeling will make itself felt at the convention. The demand of the finishers for equal representation with the puddlers will also be an important element in the convention. The whole truth about the convention of July 3, at Pittsburgh, has not been told in public, but if the views of that convention are carried out, its effect on the strike will be very important.

As regards the present situation, the only important development of recent occurrence has been the acknowledgement by the workmen that the backbone of the strike in Cleveland has been broken by the success of the Cleveland Rolling Mill Co. in its endeavors to run non-union. It is stated that on Saturday a committee of six members of the Amalgamated Association called upon President Chisholm, at his company's office, to say that the men had been deceived into going into the strike and desired to return to work. Mr. Chisholm declined to receive them as a committee, in accordance with his well-known policy not to recognize the union in any manner. The workmen were told

if they wished employment they should apply at the mills, where they would be talked with as individuals. They went to the mills with the same request, and after a consultation with the superintendent left, saying they would ask President Jarrett to declare the strike off.

President Jarrett, of the Amalgamated Association, has been interviewed by one of the Pittsburgh daily papers, and he stated that it was the first intimation he had received that any action such as reported had been taken, but, after a pause, said he had reason to believe that the report was not without foundation. Sixteen of the strikers became discouraged last week and returned to work in the converting department of the mill, and since that time he had been almost satisfied that it would be useless to continue the struggle longer. He supposed a committee would call upon him to day, and if they did so he would advise them to return to work at the company's terms, as he considers it wrong to ask men to continue a struggle against their own judgment, and in which the extent of their loss will be measured by the length of time they are idle. The chief reason for giving up the ship, he said, was because under the rules benefits were paid only to persons who had been members of the association six months. The Cleveland men had not been in the association that long, and received no assistance, and many were compelled to return to work in order to supply their families with the necessities of life.

When asked whether, under the terms of the Rolling Mill Company, the strikers would be compelled to abandon their organization, Mr. Jarrett replied, in a cheerful manner, that that matter would be "got over" in a very short time. What means were to be used he did not say. The effect of the failure at Cleveland, while beyond doubt discouraging in a sense, he did not appear to think would make any change elsewhere. The organization had been but recently established at Cleveland, and the fact that the men of that place were not firmly rooted and grounded in the faith, he explained, accounted for their admitting themselves to be beaten in what in other localities had come to be regarded a short time. In other sections and in Pittsburgh, especially, he contended, the fact that one firm at great expense had won a victory would not be felt. Notwithstanding Mr. Jarrett's cheerful view of the matter, the fact remains that the Amalgamated Association have been beaten in the city where a few days ago they claimed that the strike was not broken, that it was as strong as ever, and that it would certainly end in victory for their side. To come from such assertions as the last to a statement such as Mr. Jarrett is said to have made in the foregoing interview, looks very much like an "advance backward."

In an interview in the Pittsburgh Post of Friday, President Jarrett is made to say that 30,000 men are at present idle in the mills because of the strike, of which 16,000 belong to the union. He also states that there are 13,000 members belonging to the union in the West and over 10,000 in the East. This would make 30,000 members. As it has been claimed that the membership of the association was between 65,000 and 70,000, where is the other 25,000 or 30,000? In answer to the question as to how many mills are at work now which have signed the scale, Mr. Jarrett said 16—The Whittaker Iron Company, Wheeling; Carnegie Bros., Pittsburgh; Kirkpatrick & Co., Leechburg; Singer, Nimick & Co., Hussey, Howe & Co., Pittsburgh; C. Westlake & Co., Warren, Ohio; Akron Iron Company, Akron, Ohio; Sharp & Daniels, Steubenville, Ohio; J. L. Edwards & Co., Canal Dover, Ohio; Forest City Iron Works, and Union Rolling Mill Company, Cleveland; James Ward, L. B. Ward, Niles, Ohio; Ohio Falls Iron Works, New Albany, Ind.; North Chicago Rolling Mill Company, Bay View; Dilworth, Porter & Co., Pittsburgh; Lawrence Rolling Mill, and "Old Mill," (the latter run by the N. Y. and O. Iron and Steel Co.), Lorain, Ohio; Calumet Iron and Steel Company, South Chicago, Ill.; Moundsville Towing Mill, Moundsville, W. Va. Several of these have not signed "the scale," if by this is meant the scale presented May 31st. These have signed "a scale," but not the scale of May 31st. However this may be, at east six of these sixteen are reported as denying that they have signed any scale; verbal and written agreements have been made, but no scale has been signed.

As an offset to this there are, counting steel mills—and, as Mr. Jarrett's list includes steel mills, this is fair—at least 13 mills running that have signed no scale nor entered into any agreement with the Amalgamated. Among these are Everson, McCrum & Co., Scottsdale; W. D. Wood & Co., McKeesport; Laufman & Co., Apollo; Park, Bro. & Co., Pittsburgh; Miller, Metcalf & Co., Pittsburgh; A. Kloman, Pittsburgh; Lake Erie Iron Company, Cleveland; Cleveland Rolling Mill Company, Cleveland; Ohio Iron Company, Zanesville; Wellsville Plate and Sheet Iron Company, Wellsville, Ohio; McDonald & Bro., St. Louis; and two other concerns that it is not best to name. Add to these the very much larger number that have not signed and are idle, and the fact remains that at the beginning of the eighth week in no previous struggle has the condition been so favorable to the manufacturers. There never was a time at this date in the struggle when so many mills were running non-union, when so many mills were

idle, when so few were running. One feature in connection with this struggle has been the failure of the United States Iron and Tin Plate Company. Though this company was embarrassed, it is claimed that they could have got through had it not been for the strike. This was one of the class of mills upon which the demands of the association bear most heavily.

### Sliding Scales in English Iron Works.

For many years the wages paid the iron-workers in the North of England have, for the most part, been based on sliding scales. The Board of Arbitration in existence in that district was organized in 1869, and in 1871 the first sliding scale was adopted, the basis and terms of the scale being arranged in connection with the board. The arbitration which has just been held at Middlesbrough (April 12 and 13), with Mr. J. W. Pease, M. P., as arbitrator, has brought out the history of these scales. This, with other information in our possession, enables us to give a full account of the working of these scales, and to make a comparison between the English scales and those in effect in this country.

First, as to the basis of these scales. An examination of them shows that the rule that has prevailed for many years in England of paying for puddling on the basis of a little more than one shilling for each £ selling price, has been adopted as a basis. These scales show that the extra above shilling to the £ varies from 9/ to 1/6. It is difficult to express this by percentages, but it will average, say, 6 1/2 per cent. of the realized price for iron. A second feature of these scales is that there is no limit. The wages for puddling decline with the fall of the price of iron. A third feature of the English scale is that it is based on the average realized selling price for iron. This is arrived at by taking from the books of the firms the latest weight of all classes of manufactured iron sold, and the total amount received for such iron, from which is deducted the amount of freight included in invoices, the discounts on payments and the commissions paid, if any. From this is also deducted all allowances or losses for defective quality. In short, the prices on which wages are based are the net cash prices at the works, less commission to agents. After all these deductions are made, the remainder is divided by the amount of iron sold, and the quotient is the average realized selling price per ton. A fourth feature of these scales is that the realized selling price of each quarter is taken as the basis of the wages for the next quarter.

Now, taking up these different features and comparing them with the sliding scales in force at Pittsburgh, in the first place the percentage between the price of puddling and selling price of the iron is very much greater in this country than in England. The iron sells for more, which at the same percentage rate would give more wages, but in addition the percentage is also greater. It is impossible to arrive at the rate in this country, but it will be from 8 to 10 per cent. of the nominal card rate on bar iron. The puddler, for example, in this country is paid \$5.50 at Pittsburgh to-day on a 2 1/2% card, or \$56 a ton, while in England he is paid 8/- on a realized net price of £6 3/-, or at \$4.50 to the £

offers an incentive to gigantic speculation, usually taking the form of "corners," from which the country at large suffers beyond computation. There is not a mechanic or humble laboring man who does not to-day feel the blighting curse. The following table gives the names and membership of the several exchanges located in New York, and the value of seats:

	Members.	Value of Seats.
Produce Exchange	3,000	\$2,500
Stock	1,100	30,000
Maritime	2,000	150
Cotton	800	250
Petroleum	400	5,000
Am. Min.	300	700
New York	450	1,200
Coffee	113	300
Sugar	60	85
N. Y. Iron and Metal Ex.	300	175
I. & M. Ex. Co. (Limited)	165	40
Hab. Exchange	300	40
Building Material Ex.	300	90
Mech. & Traders' Ex.	150	40

In a general survey of the foregoing, it is to be observed that the later attempts to organize exchanges in the trades have not, in every instance, been a signal success. For example, we miss from the list the Tobacco Exchange, organized a few years ago with considerable *éclat*. It had a short life, for from the nature of the article it was found impracticable to establish a scale of standards to serve the purposes designed. Neither do we find the new Sugar Exchange. Although it has a nominal existence, it is virtually defunct. From the start, refiners and many of the importers refused to do business in it, and permanent injury resulted to the trade. Refiners resorted very largely to the practice of buying their goods "cost and freight" to come to them direct, so that the old legitimate importing trade was almost broken up. The refiners regarded the rules as arbitrary, but the main objection given was that the exchange fostered speculation—i. e., dealing in "futures," or buying and selling goods which were not actually in hand.

Another experiment of like nature is being worked out in the Coffee Exchange, the object of which, more especially, was to regulate brokerages. The jobbers, however, are much against it. As one of them remarks: "The brokers got up a line of standards, but as no two lots were alike it was impossible to have a standard." Speculation, too, formed a lively element, as was illustrated not long ago, when this market ruled 1/2 to 1 cent lower than the producing market. This was because importers bought more coffee than the country could absorb, but the purchases were insolvent, and buying on 90 days they attempted to tide over a critical period, but ended in disastrous collapse.

The Produce and Cotton Exchanges both enjoy extraordinary prosperity, and both actually handle enormous quantities of merchandise in daily cash transactions. The new building for the former, now in progress opposite Bowring Green, will be a permanent structure, grand in proportions and design, and the Cotton Exchange, in like manner, will proceed to erect a building, commodious and elegant, on the present site of the Maritime Exchange, as soon as their title to the property can be secured.

The latest, and perhaps most interesting, of the experiments in this line are the two iron and metal exchanges lately established in this city. They are too new, as yet, to be judged by what they have accomplished, and wide differences of opinion as to their probable success are expressed by the traders more or less interested in them. The history of these exchanges is so well known to those of our readers who have followed our comments from week to week, that it need not be gone over here. The gentlemen interested in establishing the Iron and Metal Exchange Company, Limited, evidently sought to defeat the scheme of organizing an exchange on the plan proposed by those instrumental in calling the meeting of February 15. It seemed to be inevitable that one exchange would be organized, and the committee appointed by the chairman of that meeting took the unusual course of organizing what should be an exchange in name, rather than in fact. It was, we have no doubt, expected that this movement would prevent an organization under the management of the brokers, but this expectation was disappointed. A great many of those who felt themselves discriminated against were in no mood to be quietly suppressed, and the second exchange was organized on the plan originally contemplated. It still remains to be seen, however, whether either exchange can succeed in establishing itself as a power in the trade. The business thus far done on the floors of these exchanges does not seem to have been of much consequence. Unless we are much mistaken, most of it was previously arranged between the parties in interest, and could as well have been completed where the details were arranged as on Change. We doubt if the daily calls have led to any business which would not have occurred as the result of private arrangement between buyer and seller. Indeed, we fail to see how, without such arrangement, the otherwise serious obstacles to the purchase and sale of iron and metals could be overcome. It is easy to fix arbitrary standards and to adopt codes of rules for the settlement of all disputes likely to arise; but in legitimate transactions in metals there are considerations vastly more important than any which can be anticipated by a code of rules. If a transaction is purely speculative, it can be conducted as well under a code of rules as in any other way. If, on the other hand, the buyer is or represents a consumer, and buys to meet his own or his client's actual wants, he would scarcely feel safe in

making or accepting a bid, and for this reason the business actually done "on call" has been small, and, we suspect, chiefly for effect, being based on full previous understanding between buyer and seller. This sort of business cannot long be either entertaining or profitable, and we are not surprised to learn that, in response to a petition bearing many signatures, the Board of Managers of the Iron and Metal Exchange Co., Limited, have unanimously decided to abandon public calls. The reason for this action was that a majority of those who have the privilege of the floor of the Wall street exchange have, from the first, looked upon the calls as a farce, and the business supposed to result from them has been regarded as done chiefly for effect. The opinion is generally entertained that most of it was by previous arrangement between buyer and seller, and that it could as well have been completed when the details were arranged as on Change. But, however this may be, the fact that the abolition of the call was generally desired by the members, and unanimously agreed to by the managers shows that at least it has served no good purpose, but has been an annoyance and an embarrassment. The managers were, we think, wise in returning to the original plan of making the exchange a daily meeting place for those who choose to come, whether for business or for social intercourse.

In the Pearl street exchange a very different policy is likely to be adopted. There the calls are the principal feature, and their abandonment would probably deprive the exchange of its only excuse for being. It is a fact, however, that by many in the trade the prices bid and asked and the transactions reported are not accepted as indicating the actual condition of the market; they will probably be continued, nevertheless, unless the now small attendance should be reduced to the secretary, president and janitor. If these calls were all the managers designed and still hope to make them, they would undoubtedly interest the members a great deal more than they do. We understand that the season is unfavorable to a large attendance, and that the calls will attract more attention during the fall and winter than at midsummer; but, "business is business," whether the thermometer records 19° or 90°, and thus far, we fear, the calls in the Pearl street exchange have been more talk than business. This, at least, is the impression in trade circles.

We are not prepared to say that an Iron and Metal Exchange is not possible in New York, but we incline to the belief that existing conditions do not favor it. Our warehousing system is imperfect, and cannot be reorganized in the present relations of production and consumption. In iron and domestic metals there is a tendency in the direction of more intimate relations between producer and consumer, and the wants of an enormous consumption may be supplied so quietly as to leave the general market in a condition of dullness approaching stagnation. The consumer is likely to prefer these direct transactions with makers to any other system of purchase, especially as it enables him, without speculation, to anticipate his estimated wants by placing contracts for what he is likely to need in future. This kind of business can neither be facilitated nor discouraged by an exchange, and it is an open question whether what is left is enough to justify maintaining even one exchange. The Wall street exchange is a convenient meeting place for those who have acquired the privilege of the floor, but beyond this we fail to see that it has any important function. The Pearl street exchange has a much larger ambition, but we do not see just how it is to be realized. We are not disposed to attach much weight to the prediction that it will develop hurtful speculation on a large scale, for the reason that its members cannot possibly control the metals they deal in, nor seriously influence the market by fictitious quotations in the absence of actual business. We may exaggerate the obstacles to the success of our iron and metal exchanges, but they seem to us insuperable. However, they are likely to have a fair trial, and, as each is certain to live a year at least, we shall better know twelve months hence whether either has been of enough benefit to the trade to hold its membership. Experience in other trades has shown that it is easier to organize exchanges than to keep them alive, and that starting off with *éclat* does not insure success. If an iron and metal exchange in New York is not needed, it would be impossible to sustain one—much less two. If one is needed, we shall probably witness the operation of the law of the survival of the fittest, and predictions at this time would be neither safe nor in good taste. It is perfectly evident, however, that should a Kilkenny cat-fight develop between them, it would end in victory for neither and death for both. In avoiding this the members of the Pearl street exchange are wise.

The proposed correction by Congress of the decision of the Treasury Department, under which hoop iron in the shape of cotton ties has been imported at about one-half the rate of duty imposed upon it by the tariff act, has caused quite a stir among those interested in cotton, and statements which, to say the least, are questionable have been sent in hot haste to Congress. The plain fact about this matter is that there is neither justice nor equity in admitting cotton ties at a less rate of duty than the hoop iron out of which they are made. There is no justice in compelling a party who wishes to use 1" X No. 15

hoop for barrels to pay 1 1/2 cents per pound duty while 1" X No. 18 hoops for cotton ties pay 3/4 cents. This was not the intention of the law, and it is against the spirit, and, we believe, the letter of the law to permit it, and if it is permitted under Treasury decision no time should be lost in so changing the law as to make it impossible that it shall be continued. The statement that this addition will ruin the planters or seriously affect them is absurd. If they had to pay the whole additional duty, which they will not, it would make a difference in cost of 8 1/4 cents to a bale of cotton. We do not recall the weight of a bale of cotton, but say 400 to 500 pounds, an almost insignificant sum per pound. When, in addition to this, it is considered that for these ties, for which the planter pays, say, 3 1/2 cents a pound, he gets the price of cotton, the hardship is not manifest. There are 11 pounds of ties to a bale of cotton. With cotton at 11 1/2 cents and ties at 3 1/2 cents, the profit would be 8 cents a pound, or 88 cents a bale of cotton—ten times as much as the proposed increase of duty. It is argued against this statement that this profit is not made; that in selling the cotton, though no tare is deducted, the fact that this iron is paid for reduces the selling price of the cotton. No one who understands the selling of cotton can honestly say this. Cotton baled with iron ties is worth more in the New Orleans markets than baled with anything else, or loose. Indeed, to a larger portion of the trade baled or tied with anything else than iron, it could not be sold. Instead of the ties reducing the cost it increases it.

#### The Brooklyn Bridge.

The following appears in a daily paper: Specifications have been prepared by the engineers of the East River Bridge for elevated terminals for the railroads over the bridge, with waiting rooms and ticket offices. On the New York side the terminus is to be 20 feet from Chatham street, and will be 200 feet long, 50 feet wide, and two stories high. The top platform is to be on a level with the New York Elevated Railroad, so that trains can be switched upon the bridge. Upon the ground floor there is to be a waiting room, 12 x 40 feet finished in Georgia pine, with black walnut wainscoting, and there is also to be a ladies' retiring room. Three ticket offices are to be placed on each side of the waiting room, the plan being to adopt the same method of collecting fares as at Fulton Ferry. An iron stairway is to be constructed from William street, to provide an entrance in addition to the main entrance, and iron railings will separate the footpath and the roadway below. In Brooklyn a duplicate of this building will be erected, with a slight modification made necessary by the curve of the roadway to Sarda street. The specifications provide for the completion of the buildings by Jan. 1, 1883.

This is only another blind, and additional dust thrown into the eyes of the people, as it is a well-known fact that no application has been made to the Legislature yet for establishing approaches to the bridge. The requisite formalities would require about a year, and if the ring intended to finish the bridge within that time they would have provided for the Brooklyn approach long ago. It is no secret that they have already commenced talking about an additional appropriation for this purpose. Where, then, is the use of issuing these specifications, especially since the bridge is not intended to be finished until the Rapid Transit Ring have arranged their plans for railroad connections, and are yet waiting for the election of a Mayor and Governor favorable to their nefarious plans?

It cannot have escaped the notice of intelligent workingmen that a majority of the strikes which have occurred during the last year and a half, not to go further back, have been what may be called strikes against reason. The men have made demands which could not be acceded to by the employers, or have resisted reductions which the condition of business rendered imperatively necessary. Intelligent arbitration would probably have prevented many of these strikes, but arbitration is not regarded with favor by workingmen in this country, and has never become an established principle in the regulation of labor disputes. We think it probable that, in a few years, its practical advantages will be recognized on both sides; but, in the meantime, why would it not be well for the trade unions to organize, from their own membership, well-chosen committees to carefully examine and report upon all facts of interest affecting the relations of labor and capital? Committees of this kind could gather a great deal of valuable information, in which the membership of the unions would feel great confidence. While manufacturers will not, as the rule, confer with committees from unions who come to them with improper demands, they would, we are assured, be glad to talk with committees seeking information, and would truthfully lay before them the facts of their business as regards cost and selling prices. Such committees could also gather a great deal of valuable information respecting the general condition of trade throughout the country, and could in many ways intelligently advise the unions as to the timeliness of proposed strikes, and the probable issue should they be declared. We are confident that, had such preliminary investigation been made, most of the strikes now in progress would never have been begun. The members of the *Amalgamated Association of Iron and Steel Workers* seem to be the only ones in the country who did not know that the strike of the Pittsburgh mill operatives on the 1st of June was a fatal mistake. The striking operatives of the cotton mills in New England seem to be totally ignorant of the actual condition of the business at this time, and it is quite certain that their leaders, even

if they knew it, would not tell the men anything likely to discourage them. The plan we propose is certainly one which merits favorable consideration, and if well-chosen committees are appointed from each of the trade unions to investigate all conditions affecting the interest of the wage-earning class, we have reason to believe that the relations between labor and capital will at once become more harmonious, because based upon a clearer conception of what those relations actually are.

#### British Railway Management.

The committee on British railway rates and fares which has for some time past conducted investigations of complaints against the management of railways, has now arrived at a final decision, and a report embodying all particulars will shortly be presented to Parliament. Two reports had been previously submitted to the committee, one by the chairman and the other by one of the members, the latter being adopted as the basis for the deliberations which were commenced shortly after. The two reports contain points of considerable difference, that of the chairman advising an extensive amalgamation of English Railways, owing to the present costliness of traffic which results from multiplicity and want of harmony in the management. The report favored by a majority of the committee, on the other hand, does not touch upon this at all, and is somewhat more antagonistic to the interests of railroad companies, declaring that it is scarcely allowable for the latter, with a monopoly of goods traffic, to endeavor to bribe consumers at a distance to compete with those at hand by offering cheap rates which will neutralize the advantage of vicinity to the market. It is suggested that a uniform classification of traffic for all railways would be a great advantage, and Mr. Barclay, the author of the favored report, thinks that while there was an increase in rates following the rise in the prices of materials in 1879, the railway companies have forgotten to reduce their rates now that materials are cheaper. The chairman's report, however, points to the fact that the accusations against the companies have not been established; that they often charge less than they lawfully might; that increased charges for improved facilities for receiving or unloading are perfectly just, and that exceptional rates may be regarded as on the whole conducive to public welfare. An important feature of Mr. Barclay's report is the recommendation that a small department in the Board of Trade should be created for the special purpose of taking cognizance of the complaints by the public against the railway companies, for the violation either of their special acts or of the public statutes. It would be the duty of this department to investigate complaints where well founded, to require redress, and, if necessary, to take the railway companies before the commission. The committee is unanimous on the necessity of a system of through rates on canals, and on the propriety of arming the Railway Commission with authority for hindering the more immediate subjects of its jurisdiction from depriving their customers of the privilege of choice between a truck and a barge. Both reports acknowledge the necessity of redress for well-founded complaints of excessive charges, but differ in regard to the question whether existing laws offer ample protection against such actions. The changes advocated and measures to be adopted in connection with the subject have been moderate, considering the numerous complaints made, and it is to be hoped that the efforts of the committee intending to remove existing difficulties will be appreciated.

#### Locomotive Practice.

There are some indications that locomotive practice in regard to pressures may undergo a decided change. For many years the locomotive boiler has carried in regular practice pressures far higher than those thought practicable in either marine or stationary practice. Recently both land and marine engines have been employing much higher pressures than formerly, and locomotive practice in this particular is no longer exceptional. Mr. Underhill, the superintendent of the motive power of the Boston and Albany Railroad, has recently been constructing a locomotive boiler intended to carry 160 pounds per square inch. It does not differ in any very marked degree from the ordinary locomotive boiler, save, of course, in the details, but it is exceedingly interesting as indicative that the master mechanics are beginning to wish for a greater economy in the use of steam. The cylinders are of somewhat unusual proportions, 18 x 22, and it is evidently the intention to make a step in advance in the matter of economy.

The great difficulty in improving the locomotive engine is the restricted size of its fire-box. Until some new form of boiler is introduced, or some of the well-known plans for its enlargement adopted, or some change made in the general design which will enable a larger fire-box to be used, we think that the designers will have great difficulty in effecting more than small improvements. Probably no one thing has occasioned greater difficulty in obtaining powerful engines for very high speeds than the necessity for placing the fire-box between the driving wheels. The suggestion made not long since by one of our most eminent engineers, to turn the locomotive boiler end for end on its frame,

is a step in the right direction. Probably the Forney engine, with its tank and coal upon the leading truck, could be made to give greater power and economy than any of the ordinary forms of "American" engine. In the Forney engine there is practically no limit to the width of the fire-box or fire-box end of the boiler. The engine can be made as wide as the rolling stock. With ample fire-box, large fire surfaces and ample room for tubes, an unlimited supply of water can be obtained. The same result is secured in the well-known Wootton engine, so largely used upon the Philadelphia and Reading Road. In this design the fire-box is spread out over the wheels, and the width is only limited by the standard width of car. Both styles will doubtless be largely adopted as the demand for high speed and more power becomes more imperative.

#### The Employers' Liability Act in Great Britain.

The Employers' Liability Act, as now in force in Great Britain, and to which we have quite recently referred editorially, still continues to agitate both miners and colliery owners. It is evident that the act in its present form will at no time offer a ready solution of the difficulties which are of daily occurrence, and a radical change in the system appears to be in urgent demand. The agreements which are in many cases entered upon between workmen and their employers meet existing requirements within certain limits only, and some short time since a case raising a question of vital importance in this connection attracted considerable attention. The point was whether a workman can by contracting himself out of it in case he is killed by any accident in his employment. The London *Mining Journal*, referring to the case, says:

The question had arisen in the collieries of the Earl of Dudley, which are very extensive, and in which there are some thousands of men employed. Under the act there is a kind of club, for the purpose of paying compensation to members in the event of their being disabled by sickness or injury, and to their widows and children in the event of death caused by accident in course of employment. To this club Lord Dudley contributes a sum equal to the amount subscribed, and which, it is understood, is very large. Just before the act came into operation there was a meeting of the men, who agreed to accept the conditions of employment offered to them by the Earl, among which was an express stipulation that neither the workmen nor their representatives should avail themselves of the provisions of the act by actions against him for compensation; and there was also evidence that these conditions were posted up in conspicuous positions in the collieries. One of the men had lost his life in a colliery accident, and his widow sued for compensation. The County Court Judge decided that the widow had rights of her own under the act which no contract made by her husband during his lifetime could deprive her of; he, therefore, gave judgment in her favor.

The Earl of Dudley appealed, and in the subsequent proceedings the decision of the Judge of the County Court was reversed, thus legally sanctioning the right of a workman contracting himself out of the "responsibilities of the Employers' Liability Act." The importance and justice of this decision are out of question, clearly showing, at the same time, that the intended purpose of the act may be easily and successfully avoided.

It is in this connection that a few suggestions concerning the establishment of miners' orphans would not seem out of place, and the proposals which, it is stated, have lately been mooted in Great Britain for this purpose are worthy of sympathy and encouragement. Such establishments, if scattered throughout the mining districts of the country, would not fail to meet with universal approval, and, decisive measures being once adopted, valuable aid would undoubtedly be rendered from many quarters. Judging from the flourishing condition of the different mining institutes, there seems to be no reason why establishments of the kind mentioned should not share an equal success, and small weekly contributions from the miners, combined with donations from wealthy colliery owners, would supply the funds necessary for their maintenance. Our worthy contemporary, the *Mining Journal*, has calculated that if the 6000 men who work underground in the lead and copper mines of Cornwall and Devon were to subscribe only one penny per week, a sum of about \$15,000 would be available at the end of the year for the most benevolent of purposes. The much larger number of coal miners would turn out the vast sum of about \$388,000, and if colliery owners could be induced to give the same amount as the men, ample means would be at hand with which to commence operations. It is to be hoped that the project now under consideration will not be abandoned, and with the liberal support that may certainly be expected, we do not doubt its ultimate success.

Hiram Dexter, who died yesterday at his residence, 200 West 32d street, this city, was one of the oldest American manufacturers. He was born in Roxbury, Mass., in 1801. In early life Mr. Dexter, associated with his father and brother, began the manufacture of the first axes made in America. Subsequently, coming to New York State, he became superintendent of an ax factory at Dobb's Ferry, and still later he removed to Paterson, N. J., where he had an ax factory. He afterward became interested in the erection of the first malleable iron works constructed in the United States. Later in life he engaged in the manufacture of saddle hardware, in which he continued up to within a few years of his death. The deceased leaves a wife and two sons. Death was caused by pulmonary consumption, from which he had suffered for many years.

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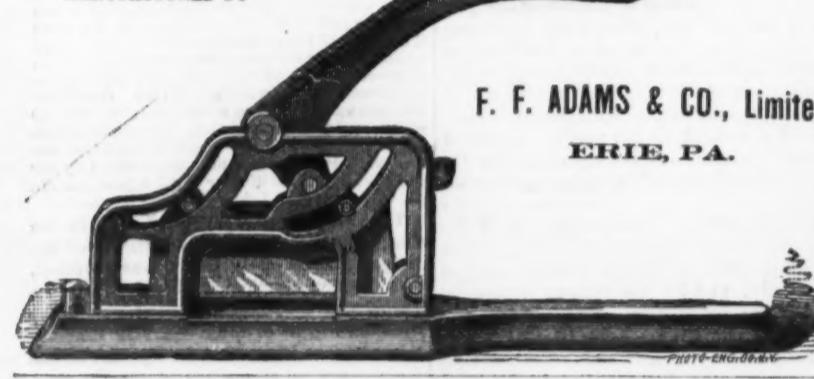


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OUR STOVE PLATE FACING IS INDORSED BY THE LEADING STOVE FOUNDERS  
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To Whom it May Concern:  
We have during the past four months used about 75 barrels of the "WHITEHEAD STOVE PLATE FACING," and find it the best and most economical that we have ever had in our Works, and shall continue to use it while supplied with the present quality. This Facing is manufactured by the AMERICAN FACING CO., 515 West 15th Street, New York City.

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This is the only Stretcher made with a SELF-ADJUSTING SLOTTED LATCH that will adjust itself to the RATCHET, either side of the post, or at either end of the wire, now wind up and lay out the wire, then lay the wire under the latch eccentric on the frame, and the other end to the latch eccentric at end of rope; now draw them together and splice. For raising hogs, cattle, or any other weight it is not necessary to have a man hold it up, as one man operates it, and follows it en route to the post. One man standing at the post operates the LITTLE GIANT alone, and very easily.

Price \$1.50 Each. Discount to the Trade.

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**AND SEAT SPRINGS.**

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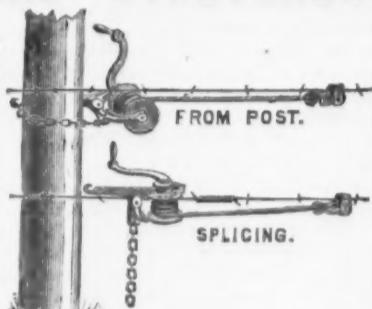
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These Bells are manufactured by a secret process, and from the very best quality of Bell Metal. For volume and richness of tone they have no equal.

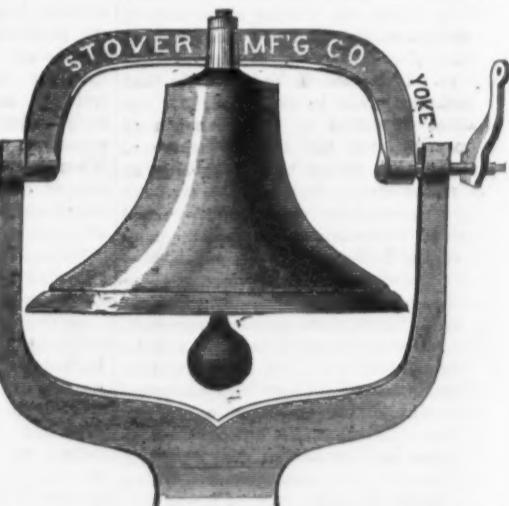
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The Chicago Steel Horse Shoe Co.,

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These shoes may be ordered in single or assorted sizes from the leading Hardware houses East or West. Among whom are:

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Dunning Sizes..... 4, 6, 8, 10.  
Correspond with Iron Shoe, 2, 3, 4, 5.



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FOR ALL STATES EAST OF OHIO.

60 Liberty St., New York

These shoes are forged from a solid bar of steel.

Afford a natural, even bearing for the foot.

They will cure corns and improve tender feet.

Being a finished shoe it only requires the work of shaping and nailing on.

Send for sample keg (100 lbs.) assorted sizes.

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Bend for Circulars and Price List, showing our liberal discounts to the Wholesale trade.

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Gentlemen:

We refer you to our advertisement in the issues of June 8th and July 6th. There will only be one more like it, August 3d, for the Sheet Iron business will not stand any such expense long, as you know; therefore, look at them carefully, pick out the kind of Hods and Shovels you want and forward your orders before they are all gone. We have a large stock now and can fill all orders promptly, but if the strike lasts it will be impossible to get iron at any price; therefore send on your orders early, for those that come first will be first served.

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## SCIENTIFIC AND TECHNICAL

### THE ARMSTRONG RIBBON GUN.

According to London *Engineering* the firm of Sir W. Armstrong & Co. have recently submitted for trial a breech-loading gun upon a peculiar system of construction. This gun, though differing but slightly in its breech-loading arrangement from that of the British Government pattern, is altogether unlike it in general appearance and method of building up. The whole of the piece in the rear of the trunnions is built up of steel wire, over which are shrunk ordinary, yet thinner, coils of great tenacity. The gun's diameter where the charge rests, as compared with that of the War Office construction, is astonishingly small. Its outlines, therefore, form those of a long, slim weapon. Yet it is said to be capable of bearing the explosion of 300 pounds of the slow-burning service powder, with a much heavier weight of shot than that of the 10.4-inch bore Government gun. As a matter of fact, however, the exact weight of shot or shell to be fired with the new gun has yet to be determined upon by experiment. So far, the results have been deemed satisfactory. The weight of the gun is only 21 tons 4 cwt., yet the diameter of its bore is 10.238 inches. Its length is similar to that of the Royal Gun Factories' 10.4 inch gun of 26 tons. The construction of the gun will probably do away, to a great extent, with the present principle of coil shrinking. A new obturator is also being experimented with. It is made according to the principle of M. DeBange, being composed of asbestos and mutton fat compressed by hydraulic power into proper dimensions and shape, and then fastened in front of the breech screw. This description of obturator is said to answer well so far as it has been tried. It seems to hermetically seal up the breech when the explosion of the charge takes place. The life of this form of obturator is estimated to be that of 200 rounds, at the expiration of which it can be replaced in the front of the breech screw without much trouble.

### A SELF-BLOWING FORGE.

A self-blowing forge is among recent English inventions. The hearth and the hood of the forge are of the usual pattern, a small boiler, provided with a safety valve, steam and water gauge being, however, suspended underneath the former. A pipe connects this boiler with the tuyere, and the water surrounding the latter is heated to some extent before being returned to the former. At the back of the forge is a small vertical engine, with a 2-inch cylinder and 4½-inch stroke, which, by means of a grooved fly-wheel and endless band, rotates the fan. When lighting the fire the bellows is worked for half an hour by hand, by means of a handle, and during this time it is said that sufficient steam will have been generated to drive the engine, which will then work automatically as long as required. The blast is regulated by means of a tap between the engine and boiler.

### ARTIFICIAL STONE.

An improved method of manufacturing artificial stone by the formation of silicate of lime as the cementing medium has been patented by Mr. R. H. Stone, of Brighton, Victoria. Any natural silicate, such as sand, disintegrated quartz, or other siliceous rocks or earths, a portion of which should be either naturally in or reduced to an amorphous condition, is mixed with either quicklime or an equivalent of slaked lime, by preference in the form of a pure hydrate, if quicklime be used, a sufficient quantity of water is added to cause perfect hydration. The materials are then thoroughly triturated with a quantity of water necessary to form a mass of sufficient plasticity to render it capable of being compacted by ramming or pressing in molds of any form required, it being advisable to avoid any excess of moisture beyond that necessary to permanently compact the materials. After having acquired the shape desired, the molds may be removed and the pieces placed on any suitable bed. To prevent carbonization of the exterior of the stone while setting it, the surface should be washed over with a weak solution of silica in any convenient form, thereby producing a coating of silicate of lime. This portion of the process is, however, not absolutely necessary, and is not claimed by Mr. Stone as a portion of his invention. The process of setting will ordinarily occupy from three to ten days, and enables the blocks to be handled with safety, and, although not necessarily longer than to set the surface, it allows sufficient time for it to take place throughout the mass. He next places the blocks in baths or tanks of any suitable form, and immerses them in water (by preference charged with lime or other solution of calcium), for the purpose of preventing the immediate dissolving or washing out of the lime near the surface of the stone. The tanks are then gradually heated by any suitable appliance, as by steam pipes, and maintained at an average temperature of 220° F., by preference under 212°, until the requisite degree of hardness is acquired throughout the mass, the time being from 48 hours to six days, the combining action of the lime, water and heat forming a solvent acting on the surface of the aggregates, and with the amorphous portion of them forming, as is believed, the matrix of silicate of lime. It is essential to the appearance and perfection of surface that no degree of heat should be applied by which the stone may be subjected to the disintegrating action of steam by expansion. It is found in practice that a very good stone is formed by the admixture, by measure, of sand free from all vegetable matter, 70 to 80 per cent.; amorphous silica or silicates as calcined clay, 10 per cent.; quicklime reduced to hydrate, 10 per cent.; and water, 10 per cent.

### WEAR OF RAILS IN TUNNELS.

We have on a former occasion given a brief account of the rapid destruction of rails in tunnels due to the action of sand used to insure the requisite friction between the driving wheels of the engine and the rails. It will be interesting in this connection to notice the remarks made by M. Poisot before the Société de l'Industrie Minérale, France, upon the working of locomotives in the Massay mines, the great difficulty in the way of their satisfactory working arising from the wheels slipping on the rails which were always greasy,

owing to the smoke and moisture in the galleries. In some parts only half speed could be attained and in others the wheels slipped continually, notwithstanding that the rails were well sprinkled with fine dried sand. On one occasion the joint of a blow-off cock having broken, a jet of steam escaped and was driven on to the surface of the rail. It was found that during the two days that the engine worked before the fault was remedied no slipping took place. In consequence of this the blow-off pipes on the different locomotives were so arranged as to discharge directly upon the rails, and highly satisfactory results were obtained in this manner. M. Poisot thinks that a method of obviating the excessive wear of rails in tunnels has thus been accidentally discovered.

### IRON JOISTS FOR COLLIERIES.

At a recent meeting of the Liège Society of Mining Engineers, Mr. Guibal, the inventor of the fan that bears his name, gave a brief account of some joists of special section which would, in his opinion, at no distant time displace timber supports in collieries. A shoe having the form of the letter T is placed on the floor of the driving, and receives the uprights of H section, provided with notches, in which fit projections in the shoe, and also in the longitudinals. To the joists are fitted others of I section, which replace the cross timbers. The system involves no complicated figuring and is simple to erect. The joists weigh about 30 pounds to the yard, and are capable of sustaining a load of 15 cwt. in the middle without deflection. When a working is abandoned, the iron may be taken out, thus saving about 50 per cent. of the cost. The simplicity of the system has been repeatedly admitted, but it is still a question whether it is superior, to any great extent, to the ordinary timber, taking into account the cost of erection, maintenance and sale of the old iron.

### AN IMPROVED SHRINKAGE GAUGE.

At a recent meeting of the Engineers' Club, of Philadelphia, Mr. John T. Boyd described a shrinkage gauge which was designed by Mr. Brown, general foreman of the works of the Hartford Engineering Company, and which enables the average laborer to make "shrinkage fits" instead of placing the latter in the hands of one or two first-class machinists in the establishment, as is probably done in the majority of machine shops throughout the country. The gauge resembles in miniature an arm swivel for tension rod, in which one of the plate nuts contains a fine-thread screw. The three screws have each a milled-head jamb nut, to maintain them in position when adjusted. To use the gauge, the diameter of the hole in the wheel, hub, collar, coupling or lever-plate, as the case may be, is first obtained, by bringing the inside nuts of the large screws in contact, and locking them securely with their respective jamb nuts. The fine-thread screw is then so placed that it calipers, or gauges, the required distance, and is finally locked after adjustment. One of the large screws is then unlocked and moved away from the other a distance determined by placing a thin strip of metal between the inside points of the large screws and jamming the same. This is, in reality, the measure of the shrinkage, or the difference by which the diameter of the shaft is to be greater than the diameter of the hole. The proportion in which these differences are made is obtained by experiment, and varies with the sizes and materials. The gauge is made of steel, hardened when necessary, is light and easy to use, and has a complete set of shrinkage measures properly marked for the different diameters of shafts.

### REGENERATIVE GAS BURNERS.

At a recent meeting of the Glasgow Philosophical Society, Scotland, Mr. Wm. Foulis read a paper on the Siemens regenerative gas burner. He said that the general principle of this burner was the heating of the gas and air supplies before they reached the point of combustion. This idea was suggested by Professor Faraday as early as 1843. The luminosity of a flame is due to the incandescence of the small particles of carbon, which, by the ordinary method of burning gas, are dissociated from the hydrogen gas in the early stages of the process of combustion. The important points to consider in connection with the question of the economical consumption of gas are (1) that the separation of the particles of carbon should be as complete as possible, and (2) to have the greatest available number of these particles disseminated throughout the flame. The limit of the separation of the solid particles was the point at which the flame began to smoke, and the stage of the combustion process at which the greatest degree of luminosity took place was just the point before the emission of smoke began. Another consideration was that the higher the quality of the gas, the sooner did the point arrive at which it began to smoke. In order to insure a perfect separation of the carbon particles the gas should be burned at a very low pressure; and, moreover, the temperature of the flame should be as high as possible, in order that the carbon particles may be very highly heated, and also that a greater number of them may be maintained in the state of incandescence. In the Siemens burner the gas is heated to a temperature of from 600° to 700° F., and thus the flame temperature greatly increased.

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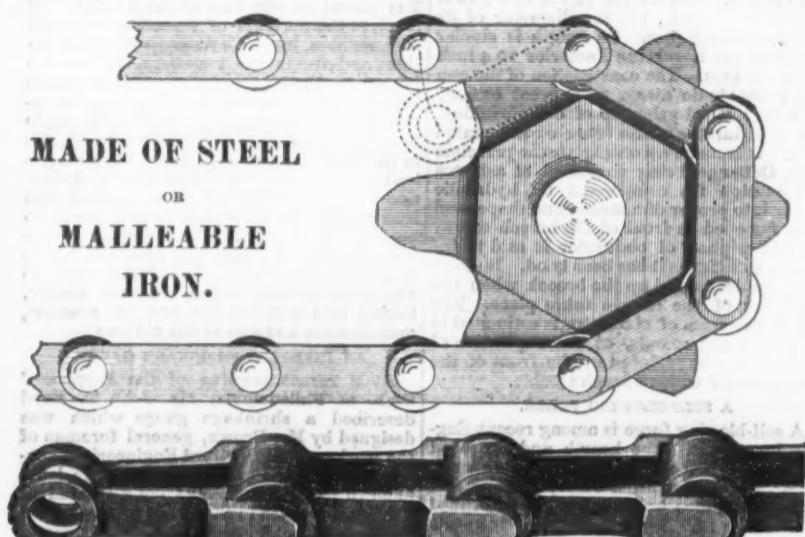
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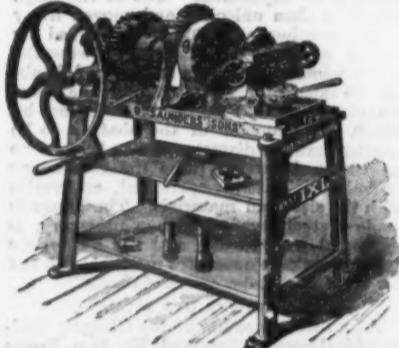


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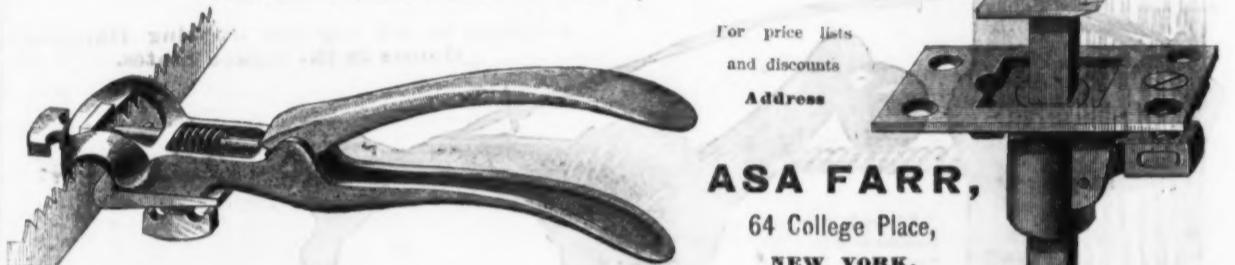
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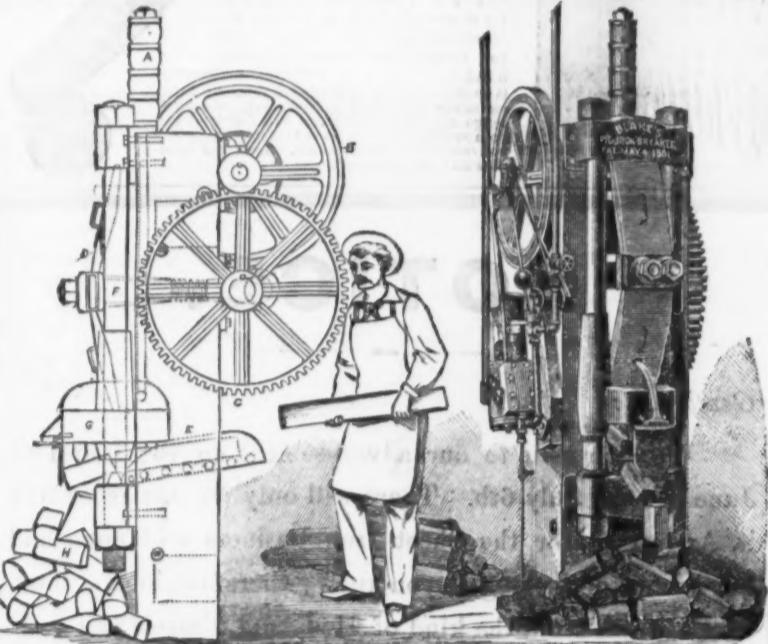
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## THE IRON AGE.

## WASHINGTON NOTES.

(From Our Own Correspondent.)

WASHINGTON, D. C., July 26, 1882.

## THE IRON AND STEEL TEST COMMISSION.

Under the call of committees of the House of Representatives, the Committee on Manufactures having been reached, Mr. Campbell, chairman, moved to suspend the rules and pass the bill, authorizing the President to appoint a commission of experts, skilled in the investigation, production and use of metallic substances and other structural materials to execute tests and experiments on iron and steel, and other materials used in the construction of bridges, buildings and mechanical structures, and to deduct useful rules therefrom. The bill, which provides for a commission of seven members, selected from among men skilled in the investigation, production and use of metallic substances and other structural materials, with the accompanying report, has already been published in this correspondence. Mr. Cox, of New York, immediately objected to the passage of this bill. Mr. Hewitt, of New York, urged its passage, calling attention to the Government testing machine at the United States Arsenal, Watertown, Mass., for which the inventor, Mr. Emery, received a medal, and which is kept in operation for the purpose of making "sporadic tests" of specimens sent by private individuals who desire information as to the strength of materials they proposed to use. "But what is wanted," said Mr. Hewitt, "is a systematic regulation and organization of these tests." He said that the Societies of Mechanical Engineers, Civil Engineers and Mining Engineers, the three great practical scientific bodies of the country unanimously recommended the bill and its objects. He then showed the importance of these tests and their advantage to the mechanical industries. Mr. Converse, of Ohio, opposed the bill, having become somewhat mixed respecting certain experiments made by Colonel Laidley, United States Army. Mr. Hewitt, of New York, endeavored to correct the gentleman, but found him so obtuse that his efforts were in vain. Mr. Candler, of Massachusetts, made a forcible speech in favor of the bill. Mr. Browne, of Indiana, made an attack upon, as he called them, "distinguished scientists, who have a patriotic inclination to scientific research, but who always seem to desire that their patriotism be supported by an appropriation out of the Treasury." Browne then displayed his ignorance of the provisions of the bill, and was brought up with a round turn by General Campbell dryly asking, "Who is it now who has not read the bill?" To which Mr. Candler replied, "I think the gentleman (Mr. Browne) has not read the bill." After a running debate the question was taken, and the tellers reported: ayes, 92; noes, 55. Two-thirds not having voted, the rules were not suspended, and the bill was not passed, the bill lacking but six of the required vote. Unfortunately a number of friends of the measure were absent. General Campbell will make another effort when an opportunity offers under a suspension of the rules. Should it be reached on the calendar, there is no question of its passage, as it has a very decided majority in its favor.

## THE NATIONAL MINING EXPOSITION.

Judge Kelley, to whom an invitation was extended some time since to deliver the address at the opening of the National Mining Exposition at Denver, on August 1st, will leave here on Thursday for that purpose. His remarks will relate to the mineral resources of the West, and the vast amount of capital, labor and mechanical appliances employed in their development. It is proposed, according to the letter of invitation to Judge Kelley, to make this exposition a permanent institution. The building makes a fine architectural display, is built of brick and cost \$250,000. This laudable enterprise is under the management of a corporation.

## THE COMMITTEE ON WAYS AND MEANS.

The House of Representatives has granted permission to the Committee on Ways and Means to sit during the recess of Congress, with instructions to assemble at Washington for the preparation of revenue bills on the second Tuesday of November next. The object of asking this authority, as stated to the House by Mr. Kasson, is that the Tariff Commission being required to report from time to time, the Committee on Ways and Means deem it important, in order to facilitate action and to get the subject properly before the House, that the Committee on Ways and Means should take up the consideration of those reports immediately after the fall elections, and before the meeting of Congress, in order to get their bill in a very forward state of preparation before Congress assembles. The Committee are evidently determined to bring the results of the Tariff Commission inquiries to a prompt test before the House, thus setting aside the charges that nothing will be attempted by this Congress.

## JUDGE KELLEY ON THE REVENUE BILL.

Judge Kelley, speaking of the probable outcome of the Internal Revenue and Tariff bill in the House, says that the amendments to the House bill reducing the tax on tobacco, sugar and Bessemer rails will strengthen it in that body, and if not modified more radically than provided in those respects, it will be promptly passed. The House is anxious to have the Senate go through with the bill and send it to them for concurrence.

## THE BECK TARIFF AMENDMENT TO THE REVENUE BILL.

Senator Beck, of Kentucky, having prepared an amendment to the tariff items of the Internal Revenue bill, providing that on and after the 1st of July, 1883, no tax shall be levied in excess of 50 per cent. ad valorem on certain schedules, in explanation of its effect says that those taxes, now over 50 per cent, can be reduced to 50 per cent, with a loss of only \$15,000,000 of revenue, and, as he claims, a relief of over \$200,000,000 to the tax payers of the country. In a table explanatory of this amendment, prepared by Mr. Morrison, a representative from Illinois, and submitted by Mr. Beck, the following relates to the schedule of metals:

Articles.	Average ad valorem rate of duty.	Amount of duty received in 1881.	Estimated loss of duty.
Iron and manufactures of:			
Anchors or parts thereof.	88.68	\$605.25	\$103.25
Band, hoop, and scroll iron, from $\frac{1}{2}$ to 6 inches wide, not thinner than $\frac{1}{4}$ inch.	54.63	40,261.13	3,306.13
Under $\frac{1}{4}$ inch and not thinner than No. 20 wire-gauge.	65.46	127,513.16	7,121.66
Under $\frac{1}{4}$ inch and not thinner than No. 20 wire-gauge.	60.62	4,848.00	349.30
Thinners than No. 20 wire-gauge.	57.66	82,612.31	7,194.25
Bar iron, rolled or hammered, comprising flats, bars, rods, $\frac{1}{2}$ to 6 inches wide, or less than $\frac{1}{4}$ inch, or less than 1 inch, or more than 6 inches wide; rounds less than $\frac{1}{4}$ of an inch or more than 2 inches in diameter, and squares less than $\frac{1}{4}$ of an inch or more than 2 inches square.	74.52	1,242.01	499.00
Cut nails and spikes.	52.35	127.18	5.79
Cut tacks, brads and sprigs, not over 10 ounces per thousand.	59.35	15.43	2.43
Cast iron, gas and water pipe, vessel, stoves and stove plates.	53.49	2,783.00	176.84
Chains, hawsers, trace and fence.	58.25	30,087.59	4,254.88
Less than $\frac{1}{4}$ inch in diameter and not under No. 9 wire-gauge.	51.08	25,787.76	3,472.26
Hollow ware, glazed or tinmed.	82.12	1,773.75	133.75
Locomotive tires and parts thereof.	64.44	23,920.31	3,355.31
Round iron in castings of an inch or less, not exceeding 100 pounds, not including oil and air descriptions of iron wire and wire of which iron is a component part, not otherwise provided for.	73.47	36.85	180.10
Sheet iron, common or black, thinner than No. 25 wire-gauge.	51.16	16,891.94	381.94
Wire, bright, cooered, or tinmed, drawn and finished, not more than one-fourth inch in diameter. Not less than No. 25 wire-gauge.	71.35	66,250.82	19,324.03
Over No. 16 and not over No. 25 wire-gauge.	61.15	385.83	70.03
Wire rope, strand or chain, either bright, coppered, galvanized or coated with other metal, subject to the same rates of duty imposed on iron wire, of which the same are composed, not over one-fourth inch in diameter—not thinner than No. 10 wire-gauge.	58.41	3,714.47	4,427.78
Over No. 16 and not over No. 25 wire-gauge.	39.62	7,851.65	1,067.15
Wrought iron, bed screws, board-nails, spikes, washers, and punch'd.	38.95	6,354.89	949.83
Wrought-iron railroad chains, fish-plates and nuts and washers, punch'd.	51.26	18,692.05	11,578.03
Steel and manufactures of: Files, file-blanks, rasps, and flasks, each 10 inches in length.	52.61	3,934.58	1,501.08
Railway bars or rails, wholly of steel.	57.71	3,730.46	2,675.05
Saws, not less than $\frac{1}{4}$ inch in diameter, valued at 75 cents or less per pound.	76.29	4,654.60	1,604,076.25
Wire, not less than $\frac{1}{4}$ inch in diameter, valued at 75 cents or less per pound.	63.71	10.83	2.33
Wire rope, strand or chain, &c., valued at above 12 cents per pound.	56.19	1,761.44	470.44
Leat: Old scrap, fit only to be remanufactured.	61.26	77.83	54.39
Ore and dross.	67.62	1,845.27	49.27
Pins, bars, and molt-n.	92.49	80.72	41.23
Silver leaf, in packs of 50 leaves.	54.32	86,441.36	7,876.83
	102.01	937.50	478.00
Total Schedule E.		5,265,789.45	1,714,311.77

## RECAPITULATION.

The total duties in 1881 on all the schedules affected by this amendment, viz: A, cotton and cotton goods; B, earths and earthenware; C, hemp, jute, and flax goods; E, metals; F, provisions; G, sugars; H, silk and silk goods; I, spices; K, wood; L, wool and woolen goods; M, sundries—aggregated \$86,230,666. The estimated loss is \$15,061,742. Of these amounts metals contributed \$5,265,789 in revenue, and the estimated loss would be \$1,714,311. The estimated receipts from duties on steel railway bars for the fiscal year ending June 30, 1883, as affected by the reductions made by the House bill, as amended by the Finance Committee, are reported at \$1,329,986.

## A QUESTION ON LOCOMOTIVE TIRES.

The Treasury Department is in receipt of information of an importation at Chicago of hammered steel forgings, generally known under the commercial designation of "locomotive tires." These are not, however, fitted to go on the wheel. The collector at Chicago levied upon this article a duty of 45 per cent. ad valorem, as a manufacture of steel. The importer, not satisfied with this ruling, appealed to the Department, claiming that the proper duty would be 30 per cent., as steel in form not otherwise provided for. The collector seems to have jumped from the frying pan into the fire, for the officials at the Treasury Department are considering whether the proper duty would not be 3 cents per pound instead of either of the above rates. The law fixes a duty of 3 cents per pound on locomotive tires. The Secretary of the Treasury has directed information to be asked of the collector at New York as to whether any similar importations had been made at that port, and, if so, how the article was rated. No action will be taken until after hearing from New York. The principle is very similar to that involved in the car-axle controversy, where it was decided that the so-called roll or hammered iron was an axle. It is therefore not improbable that the ruling in this case will be that the article is to all intents and purposes a locomotive tire, and as such should pay 3 cents per pound.

## THE INTERNAL REVENUE AND TARIFF BILL.

The Democratic Senators held a caucus on Monday and determined to insist upon a full and fair discussion of each of the amendments submitted. This would indicate an indefinite prolongation of the debate. It was generally supposed, a few days ago, that the bill would now be in a fair way toward a vote. This extension of the field of debate may last for several weeks, and it may so discourage and disgust the Senators that they may take the first chance to postpone its further consideration until December. This will mean no action at all, for the report of the Tariff Commission and the Appropriation bills will consume all the available time between the first Monday in December and March 4 following. Senator Hale having notified the Senate that further delay would be useless, said that he would antagonize the Tax bill with the Naval Appropriation bill. This will consume a day, at least. Taking everything into consideration things are considerably mixed in the Senate.

## THE DISCUSSION OF THE TAX BILL.

The general debate on the bill during the past few days has evolved no new ideas or specially new features. Voorhees made some bold charges that the Republicans had no intention of passing the bill; that it was an afterthought; and that the Republican party would not, at this session, legislate either for revision of the tariff or for revision of the internal revenue tax, and wandered about over the whole field of tariff, excise taxes, bank taxes, the silver question, and then paid his respects to the banks and the stockholders. Apparently not satisfied, he then attacked sugar, touched upon perfumery, and finally sat down, to be followed by Mr. Jonas, of Louisiana, who stuck to sugar for a while, and then struck off into Louisiana politics. The discussion for the past few days has been monotonous and unentertaining, being devoted to a rambling controversy respecting the tax on tobacco and sugar.

Articles.	Average ad valorem rate of duty.	Amount of duty received in 1881.	Estimated loss of duty.
Iron and manufactures of:			
Anchors or parts thereof.	88.68	\$605.25	\$103.25
Band, hoop, and scroll iron, from $\frac{1}{2}$ to 6 inches wide, not thinner than $\frac{1}{4}$ inch.	54.63	40,261.13	3,306.13
Under $\frac{1}{4}$ inch and not thinner than No. 20 wire-gauge.	65.46	127,513.16	7,121.66
Under $\frac{1}{4}$ inch and not thinner than No. 20 wire-gauge.	60.62	4,848.00	349.30
Thinners than No. 20 wire-gauge.	57.66	82,612.31	7,194.25
Bar iron, rolled or hammered, comprising flats, bars, rods, $\frac{1}{2}$ to 6 inches wide, or less than $\frac{1}{4}$ inch, or less than 1 inch, or more than 6 inches wide; rounds less than $\frac{1}{4}$ of an inch or more than 2 inches in diameter, and squares less than $\frac{1}{4}$ of an inch or more than 2 inches square.	74.52	1,242.01	499.00
Cut nails and spikes.	52.35	127.18	5.79
Cut tacks, brads and sprigs, not over 10 ounces per thousand.	59.35	15.43	2.43
Cast iron, gas and water pipe, vessel, stoves and stove plates.	53.49	2,783.00	176.84
Chains, hawsers, trace and fence.	58.25	30,087.59	4,254.88
Less than $\frac{1}{4}$ inch in diameter and not under No. 9 wire-gauge.	51.08	25,787.76	3,472.26
Hollow ware, glazed or tinmed.	82.12	1,773.75	133.75
Locomotive tires and parts thereof.	64.44	23,920.31	3,355.31
Round iron in castings of an inch or less, not exceeding 100 pounds, not including oil and air descriptions of iron wire and wire of which iron is a component part, not otherwise provided for.	73.47	36.85	180.10
Sheet iron, common or black, thinner than No. 25 wire-gauge.	51.16	16,891.94	381.94
Wire, bright, cooered, or tinmed, drawn and finished, not more than one-fourth inch in diameter. Not less than No. 25 wire-gauge.	71.35	66,250.82	19,324.03
Over No. 16 and not over No. 25 wire-gauge.	61.15	385.83	70.03
Wire rope, strand or chain, either bright, coppered, galvanized or coated with other metal, subject to the same rates of duty imposed on iron wire, of which the same are composed, not over one-fourth inch in diameter—not thinner than No. 10 wire-gauge.	58.41	3,714.47	4,427.78
Over No. 16 and not over No. 25 wire-gauge.	39.62	7,851.65	1,067.15
Wrought iron, bed screws, board-nails, spikes, washers, and punch'd.	38.95	6,354.89	949.83
Wrought-iron railroad chains, fish-plates and nuts and washers, punch'd.	51.26	18,692.05	11,578.03
Steel and manufactures of: Files, file-blanks, rasps, and flasks, each 10 inches in length.	52.61	3,934.58	1,501.08
Railway bars or rails, wholly of steel.	57.71	3,730.46	2,675.05
Saws, not less than $\frac{1}{4}$ inch in diameter, valued at 75 cents or less per pound.	76.29	4,654.60	1,604,076.25
Wire, not less than $\frac{1}{4}$ inch in diameter, valued at 75 cents or less per pound.	63.71	10.83	2.33
Wire rope, strand or chain, &c., valued at above 12 cents per pound.	56.19	1,761.44	470.44
Leat: Old scrap, fit only to be remanufactured.	61.26	77.83	54.39
Ore and dross.	67.62	1,845.27	49.27
Pins, bars, and molt-n.	92.49	80.72	41.23
Silver leaf, in packs of 50 leaves.	54.		

escaping gas. Search was made high and low for the hole in the pipes, but to no effect. Still the smell continued, and upon opening a closet door it appeared stronger than ever, and was accompanied by the perfume of burned leather. Closer inspection showed a pair of boots smoking and shriveled up, from the heel of which all the iron nails had been drawn. "And if it wsn't the lightning that pulled the nails out, what was it?" questioned our informant.

**Artificial Ivory.**—In making articles of artificial ivory, the greatest difficulty hitherto has been that in order to gain the necessary firmness, a large percentage of the binding substance had to be used, and hence only dull-colored articles could be produced. Recently Mr. J. S. Hyatt, the inventor of celluloid, has produced a substance in which only very little gum or other cementing material is used, so that, without detriment to its durability, the finished article may still have a pure white color. This result is arrived at by grinding up any suitable matter with a solution of a proper cement. The cement solution is then expressed, the residue is dried and ground, and the powder thus obtained is heated and pressed into molds.

The most valuable material found is oxide of zinc, and the best cement is shellac or some similar vegetable substance. A solution of ammonia forms the solvent. Hyatt first dissolves 8 parts shellac in 32 parts ammonia, sp. gr. 0.95, by thoroughly mixing the two at a temperature of 37½° C. for five hours in a rotating cylinder. Forty parts of oxide of zinc are now mixed by hand into the thin, syrupy solution, and the mixture is well ground on a color mill. The ammonia, having served its purpose, is now driven off by heat, or by exposing the mixture on glass plates for a long time to the air. The residue, consisting merely of dry shellac and zinc oxide, is again finely powdered, and the powder thus obtained is pressed into the molds with a pressure of about 2000 pounds per square inch, and at a temperature of 125° to 137½° C. If the article is to be colored, the coloring matter is either added to the solution before the first grinding, or to the dry mass before the second grinding.

Fischer & Norris, of Trenton, N. J., have issued a circular repudiating certain advertising which appears over their name in a little publication purporting to be a hardware directory. They say their advertisement was obtained by false pretenses, and they have no wish that it should mislead the trade.

## MACHINERY For Sale.

Two 15 in. swing, 6 ft. bed, Prentiss Lathes. Two 18 in. swing, 6 ft. bed, New Haven Lathes. Above are back geared and screw cutting. One 30 in. Prentiss Drill. One 30 in. Prentiss Drill, back geared and self feed. One 30 in. Prentiss Drill, back geared and self feed. One 10 in. Gouid & Eberhardt Shaper. One 10 in. Gouid & Eberhardt Shaper. One No. 2 Davison Steam Pump. One 72 ft. of 16-in. Englehardt Balls, with spikes, in bond. Greenfield Engines, 1/2 to 25 horse power. Roots Force Blowers, all sizes. All of above Machinery is entirely new, and can be seen at our warehouses. For further particulars address

**COOKE & CO.,**  
13 (Old No. 6) Cortlandt Street,  
NEW YORK CITY.

## For Sale.

TO HARDWARE MEN. RARE OPPORTUNITY. Hardware Store. One of the best stands in Pennsylvania. Established over 3 years, stock very clean, and best reasons give. For selling. Address, J. B. Office of *The Iron Age*, 220 So. 4th St., Phila.

## Wanted.

In a Retail Hardware Store. A young man acquainted with the business. Address, giving reference and stating salary expected. P. O. Box 503, New Haven, Conn.

## ROLL TURNER.

A thoroughly practical roll turner on guide iron and shape iron can obtain a good and steady job by applying to

UNION FOUNDRY & MACHINE CO., CARASAUQUA, Pa.

## Wanted.

A THOROUGHLY COMPETENT MAN. To contract for the Scrap Piling, Heating and Rolling of Billets. Train now running. Address, with references, &c. J. A. M., Office of *The Iron Age*, 220 So. 4th St., New York.

## Wanted.

A competent person to take charge of a small Brass Mill, also, a 10-in. Finishing Roller in brass, and one fine Wire Drawing. To persons competent, and of good character, liberal wages will be paid and a permanent position furnished. Address, BRASS MILL, Office of *The Iron Age*, 220 So. 4th St., New York.

## Wanted.

A Salesman visiting the Jobbing, Hardware, and similar trades, would like to add A STAPLE SPECIALTY. Either on commission or salary. Address, A. B. C., Office of *The Iron Age*, 220 So. 4th St., New York.

## Wanted.

WANTED. A position as builder of rolling mills, or to remodel them. Will furnish drawings for either. Has built and operated seven mills North and three South. Spent last year North getting posted in all matters pertaining to mills to date. Address, P. O. Box 225, Chattanooga, Tenn.

## Special Notices. Furnace Property For Sale.

Will be sold at a low price. The Charter Rights and Real Estate of the Bloomsburg Iron Co., together with such portions of the stock of materials and other personal property as purchasers may require. The real estate consists of two blast furnaces favorably known as the Irondale Furnaces, in good condition, a steam engine, water power of 100 to 200 horse power, loads with extensive iron mines, storehouse, numerous dwellings, houses, R. R. tracks, and sidings several miles in length (connecting the furnaces with both Canal and Railroad), canal wharves with tracks and facilities for receiving and shipping large quantities of freight with economy and dispatch, either by canal or railroad.

This property is situated at Bloomsburg, Pa., within 30 miles of the Wyoming coal field. The improvements have been in continuous and successful use for 37 years. The Company own in addition extensive and valuable ore mines to Snyder Co., Pa.

All the property is in good order and now in profitable use. For further information apply to CHAS. R. PAXTON, President, Bloomsburg, Pa.

## For Sale.

THE BARREL, KEG AND BOX FACTORY, with Latest Improved Machinery, Building, and about three-fifths of an acre of ground, with Railroad and River Privileges direct to factory; situated in the most valuable part of Chattanooga. An interest would be sold to the right parties, who would take personal charge of it. For particulars inquire of C. W. GRAY & CO., Graysville, Ga., or S. B. LOWE, Chattanooga, Tenn.

## For Sale.

A GOOD MUCK BAR AND SCRAP SHEAR, for \$310. Address, CRAIG RIDGWAY & SON, Coatesville, Pa.

## For Sale.

One 45-ft. and one 30 ft. SELLERS' CAST-IRON TURN TABLE, in good order. For particulars apply to PURCHASING AGENT, PENNA' RAILROAD CO., Philadelphia.

## For Sale.

Two new 35-inch Upright Drills, weight 1600 lbs.; quick return; balance spindles latest design; p. ice, \$200. 3 new 35-inch Upright Drills, same design, only one Plane, just completed, 27 ft. Worcesterchuck 1/2 in. diameter; length of bed 86 ft.; table 6 ft.; planes 26 in. w. 6, 24 in. high; weight over 400 lbs.; made; p. ice, \$700.

S. M. YORK, Cleveland, Ohio.

Corliss Engines For Sale. PROMPT DELIVERY.

One 12-inch cylinder, 36-inch stroke, at once. One 14-inch cylinder, 36-inch stroke, in two weeks. Apply to

THE GEORGE PLACE MACHINERY CO., 121 Chambers and 220 Reade St., New York.

## Baltimore, July 11, 1882.

THE FIRM OF CARLIN & FULTON IS THIS DAY DISSOLVED BY THE DEATH OF THE LATE JAMES F. CARLIN.

J. FRANK BRADENBAUGH,  
GEORGE L. IRVIN.

## Baltimore, July 19, 1882.

The undersigned, having formed a Copartnership and purchased the good will and assets of the late firm of Carlin & Fulton, assuming the liabilities of the same, will continue the HARDWARE BUSINESS under the same firm name and at the same place as heretofore.

GEORGE L. IRVIN,  
MARTHA WHALEN,  
MARTHA J. CARLIN,  
MARY E. FULTON.

## Wanted.

TO RENT, A Foundry for Hollow Ware, Stoves and Light Castings. Philadelphia preferred. Also a well located Charcoal Furnace. Address, C. S. A., Hackettstown, N. J.

Cutlery Salesmen Wanted.

By a manufacturing and importing cutlery house in this city. To those who can control a trade among retailers liberal terms will be given. Address, X. Y. Z., Office of *The Iron Age*, 220 So. 4th St., New York.

A Firm of Metal Agents desire to communicate with American manufacturers of specialties for mines, railways, agriculture and building trades, with a view to representing them in London.

Address, 11 Queen Victoria street, London E. C., England.

## Sheet Iron.

300 tons No. 22 to 28 for immediate delivery. 200 tons to be made to order on very short notice.

Write for prices to

PACKARD, SMITH & CO., Warren, Ohio.

A MECHANIC AND ENGINEER wishes an engagement to lay out or superintend work for responsible parties. Address, A. B. Box, Office of *The Iron Age*, 220 So. 4th St., New York.

SITUATION WANTED. A young man with 10 years' business experience in iron and steel works, or in commercial travel, desires a position with a first-class house. References. Address, U. S. Office of *The Iron Age*, 220 So. 4th St., New York.

WANTED. A position as builder of rolling mills, or to remodel them. Will furnish drawings for either. Has built and operated seven mills North and three South. Spent last year North getting posted in all matters pertaining to mills to date. Address, C. M. WILDE, 129 Jay St., Albany, N. Y.

WANTED. A position as salesman, known and traveled all over the U. S. Has a large trade. Either on a moderate salary or commission. Add 604 KALBMAN'S, 56 East 12th St., New York.

WANTED. A position as a hardware salesman, known and traveled all over the U. S. Has a large trade. Either on a moderate salary or commission. Add 604 KALBMAN'S, 56 East 12th St., New York.

## Special Notices. Furnace Property For Sale.

## Special Notices. E. BISSELL & CO., Wholesale Auctioneers.

### LARGE TRADE SALE OF

### Hardware, Table and Pocket Cutlery.

ON

TUESDAY, WEDNESDAY and THURSDAY,

August 8th, 9th and 10th.

At 23 CHAMBERS and 65 READE Sts., New York.

TUESDAY, Aug. 8th.—The sale will comprise a general assortment of Hardware; also, 2000 doz. Files, 500 doz. Drawer, Till and Padlocks, 2000 doz. Hammers and Hatchets, 200 doz. Sash Brushes, asst. sizes; 100 doz. Steel Shovels and Spades, 500 doz. Hand and Panel Saws, 200 doz. Campbell & Johnson Files, 1000 doz. extra quality Cut Tacks, full 1/2 weight, all sizes; 100 Reams Sand Paper; together with other goods too numerous to mention.

WEDNESDAY and THURSDAY, Aug. 9th and 10th.—SPECIAL SALE OF Table Cutlery, Carvers, Butcher Knives, Seconds, comprising over 12,000 doz. Table Knives and Forks, d-sirable tines, in ebony, bone and cocoon; 2000 doz. Table Knives in ivory, rubber, ebony, ivoride, cocoon and bone; 1000 pair Carvers, desirable patte's; several hundred doz. Plated Tea and Table Spoons and Forks, standard plate on 15 per cent. nickel silver, and goods that we can warrant of superior quality; several hundred doz. Plated Steel Table, Medium and Desert Knives, 12, 13 and 16 oz. plate; also a large line of Butcher Knives, Bread and Kitchen Knives, Walnut Carving Knives, &c., &c.; 500 doz. 18 per cent. nickel silver Tea and Table Spoons and Forks, not plated; 2000 doz. Britannia Tea and Table Spoons; also 1000 doz. cast steel, japanned and nickel plated Straight Trimmers', Tailors' and Barbers' Shears; large line of American and Foreign Pocket Cutlery, in 1, 2, 3 and 4 blades, &c., &c.

Buyers who cannot attend the sale can forward their orders, and goods will be purchased free of charge.

WEDNESDAY and THURSDAY, Aug. 9th and 10th.—SPECIAL SALE OF Table Cutlery, Carvers, Butcher Knives, Seconds, comprising over 12,000 doz. Table Knives and Forks, d-sirable tines, in ebony, bone and cocoon; 2000 doz. Table Knives in ivory, rubber, ebony, ivoride, cocoon and bone; 1000 pair Carvers, desirable patte's; several hundred doz. Plated Tea and Table Spoons and Forks, standard plate on 15 per cent. nickel silver, and goods that we can warrant of superior quality; several hundred doz. Plated Steel Table, Medium and Desert Knives, 12, 13 and 16 oz. plate; also a large line of Butcher Knives, Bread and Kitchen Knives, Walnut Carving Knives, &c., &c.; 500 doz. 18 per cent. nickel silver Tea and Table Spoons and Forks, not plated; 2000 doz. Britannia Tea and Table Spoons; also 1000 doz. cast steel, japanned and nickel plated Straight Trimmers', Tailors' and Barbers' Shears; large line of American and Foreign Pocket Cutlery, in 1, 2, 3 and 4 blades, &c., &c.

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Buyers who cannot attend the sale can forward their orders, and goods will be purchased free of charge.

WEDNESDAY and THURSDAY, Aug. 9th and 10th.—SPECIAL



## EXPORTS

Of Hardware, Iron, Machinery, Metals, &c., from the Port of New York, for the Week ending July 25, 1882:

## Dutch West Indies

Quan. Val.

Ptms., gals. 165,496 126,116

Nails, cs. 2 61

Mach'y. pkgs. 180 2,900

Cutlery, cse. 1 56

Hdw., pkgs. 11 27

Sew. ma., cs. 10 280

Danish West Indies

Ptms., gals. 230 263

Hamburg

Ptms., gals. 6,655,496 126,116

Nails, cs. 2 61

Mach'y. pkgs. 180 2,900

Bells, cse. 1 35

Hdws., pkgs. 3 100

Arms, case. 1 125

Sew. ma., cs. 647 10,425

Metal g'ds, cs. 4 100

Bremen

Hdw., pkgs. 7 225

Mach'y. cse. 1 185

Tin plates, cs. 5 50

Ptms., gals. 567,159 13,850

Ag. imp., pkgs. 212 3,400

Ptms., gals. 364,700 50,000

Elsinore

Ptms., gals. 18,609 13,300

Fleensburg

Ptms., gals. 139,773 9,700

Rostock

Ptms., gals. 145,536 11,919

Antwerp

Ptms., gals. 1,047,616 144,203

Sew. ma., cs. 192 4,905

Mach'y. pkgs. 12 584

Guns, cs. 200 2,500

Ore, tons. 233 1,650

Hdw., cs. 14 246

Pumps, pkgs. 12 584

Rotterdam

Ptms., gals. 235,390 16,940

Mach'y. pkgs. 6 142

Dutch East Indies

Ptms., gals. 201,000 21,600

Gele

Ptms., gals. 100,432 7,000

Dantz

Ptms., gals. 456,98 35,123

Arendal

Ptms., gals. 317,017 21,913

Stettin

Ptms., gals. 534,814 41,148

Konigberg

Ptms., gals. 210,274 15,000

Christania

Ptms., gals. 156,06 18,995

Bristol

Clocks, bxs. 56 501

Ptms., gals. 192,538 25,000

Hull

Clocks, pkgs. 4 50

Hdw., cs. 1 319

Liverpool

Ag. imp., pkg. 75 3,420

Pistols, cs. 1 3,250

Hdw., pkgs. 99 3,365

Rifles, cs. 1,067

Clocks, bxs. 147 4,743

Chains, bxs. 2 1,650

Cutlery, pkgs. 8 108

Mach'y. pkgs. 50 5,305

Sew. ma., cs. 993 15,938

Ore, sacks. 307 3,600

Newcastle

Ptms., gals. 110,358 9,000

London

Mf. iron, pkgs. 6 204

Hdw., pkgs. 303 10,648

Mach'y. pkgs. 38 3,550

Nails, cs. 24 220

Sew. ma., cs. 24 220

Clocks, bxs. 29 2,570

Ag. imp., pkgs. 70 27

Ptms., gals. 94 11,600

Iron pipes. 627 9,910

Piba, mls, pkgs. 42 408

Stig.

Ptms., gals. 15,700 10,000

Canada

Tin pits, bxs. 39 149

Mach'y. pkgs. 1

Glasgow

Ag. imp., pkgs. 93 3,000

Sew. ma., cs. 14 1,031

Arms, cs. 6 462

Saws, box. 1 178

Mach'y. pkgs. 34 3,700

Hdw., pkgs. 34 3,500

Mt. iron, pkgs. 35 3,500

Wringers, cs. 3 72

British Guiana

Ptms., gals. 7,000 840

Hdw., cs. 39 1,000

Ag. imp., pkgs. 1 11

Mt. iron, pgs. 20 84

Clocks, bxs. 27 111

Hawke

Mf. iron, pkgs. 66 524

Ptms., gals. 77,150 17,150

Tacks, bxs. 32 2,500

Hdw., cs. 9 204

Ag. imp., pkgs. 23 1,325

British Honduras

Ptms., gals. 447 454

Saws, cse. 1 112

Mach'y. pkgs. 5 170

Hdw., pkgs. 29 1,070

Ag. imp., pkgs. 23 1,325

British Columbia

Ptms., gals. 1,447 454

Saws, cse. 1 112

Ag. imp., pkgs. 5 170

Hdw., pkgs. 29 1,070

Ag. imp., pkgs. 23 1,325

Argentina Republic

Ptms., gals. 47,100 6,785

Hdw., pkgs. 100 1,000

Mt. iron, pkgs. 82 1,000

Spd. wre, cse. 1 43

Mt. iron, pkgs. 84 480

Pig iron, tons. 10 1,000

British East Indies

Ptms., gls. 1,190,600 133,113

British Possessions in Africa

Ptms., gals. 350,982 24,745

Bordeaux

Ptms., gls. 73,850 5,650

Naph. gals. 44,755 2,650

British Australia

Hdw., pkgs. 955,167 1,000

Mt. iron, pkgs. 59 714

Clocks, pkgs. 290 5,849

## CHINA

## Pork

## Revolvers, cs. 1 101

## Tacks, cs. 30 2,100

## Mach. oil, cse. 1 15

## W. gds, case. 7 144

## Yel. metal, cs. 4 370

## Pork

## Hdw., pkgs. 29 1,310

## Hdws., pkgs. 25 1,048

## Scales, bxs. 1 50

## Clocks, pgs. 1 50

## Arms, cs. 2 150

## Clocks, cs. 30 400

## Tacks, cs. 30 2,100

## Mach'y. pkgs. 2 4,658

## Saws, cs. 1 79

## Clocks, bxs. 30 594

## Tacks, cs. 100 470

## Saws, mls. cs. 1 115

## Mt. iron, pgs. 12 1,000

## Clocks, bxs. 30 594

## Tacks, cs. 100 470

## Saws, mls. cs. 1 115

## Mt. iron, pgs. 12 1,000

## NEW ORLEANS!

JULY 22, 1882.—*Hardware.*—The volume of business transpiring, the season of the year considered, is quite large, and values are well maintained. *Nails.*—Stocks are light. We quote, \$3.75 @ \$3.85. *Pig Iron.*—Scotch—none in stock. American Foundry, No. 1, \$26; No. 2, \$25. *Bear Iron.*—The Birmingham mills, in Alabama, have stopped, the men being on strike. The mills are availing themselves of the opportunity to make necessary repairs, and hope, by the time they are ready to start again, that the trouble with the men will be adjusted. Prices remain as last quoted: Bars, 2.90% @ 30%; Sheets, Nos. 10 to 14, 40%; Nos. 15 to 17, 44%; Nos. 18 to 20, 44%; *Copper.*—Sheathing, 28¢; Braziers, 30¢; Bolt, 30¢; Yellow Metal Sheathing, 20¢. *Sheet Zinc.*—7½¢ @ 8¢. *Wrought Iron Pipe.*—60 @ 62½%; Boiler Tubes, 45 @ 47½%.

## ST. LOUIS.

MESSRS. HOFFER, PLUMB & CO., Pig Iron and Iron Ore Merchants, 417 Pine street, report to us as follows, under date of July 22: There is no change to report in the condition of this market. There is very little Iron selling and business generally is quiet. No change in quotations:

## HOT BLAST CHARCOAL.

Missouri..... \$24.50 @ 25 5/8  
Ohio..... 29.00 @ 29.00  
Southern..... 25.00 @ 26.00

## COAL AND COKE.

Ohio..... 24.00 @ 27.00  
Southern..... 24.00 @ 25.00

## MILL IRONS.

Red-short..... 23.00 @ 24.00  
Neutral..... 21.00 @ 22.00  
CAR WHEEL AND MALLEABLE IRONS.

Missouri..... 27.00 @ 28.00  
Southern..... 30.00 @ 35.00  
Ohio..... 28.00 @ 38.00

## Our English Letter.

## Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

LONDON, ENGL., July 10, 1882.

## THE WEEK

has been uneventful in most respects, and free from changes of any importance as regards the iron market. The weather has not been so fine over a large section of the country, heavy thunderstorms and rains having prevented the ingathering of a portion of the hay crop. The cereals are coming along nicely, nevertheless, and with fine weather at the critical juncture will prove good crops. The political situation is very "mixed," and does not tend to enlarge the sphere of commercial operations. On Friday night, July 7, the Government was defeated on one of the clauses of the Irish Arrears bill, a catastrophe which is understood to render a dissolution a by no means improbable contingency. Abroad, the Egyptian affair would seem to have reached a real crisis at last, for we hear that unless certain demands made by our Admiral are unconditionally complied with before 9 a.m. to-morrow, our fleet will proceed to bombard Alexandria. The French Government is said to be backing out of the joint intervention arrangement, while it is simultaneously obtaining heavy votes of credit to cover contingencies. It is known to be intensely jealous of the whole of the proceedings, and is rumored to be intriguing in the most desperate manner in the hope of involving France in the troubles of a serious nature; indeed, the political atmosphere of Europe is overcharged, and the storm may burst at any moment. How happy are the United States—boss of the whole American continent, and not a foe worthy of the name!

So long as political affairs are as at present business must be seriously affected. So far the positive evil effects have been chiefly confined to the payment of war risks on freights, &c., by the Suez Canal, but, indirectly, much harm has been and is being done. One thing is perfectly certain in any event, and that is that the Suez Canal must be kept open at all hazards and at any cost. We, as you will remember, opposed the making of the canal tooth and nail, but when M. de Lesseps had accomplished his task, and the canal became a great fact, we took it in the kindest possible manner, and are now its warmest defenders as well as its largest owners. Five-sixths of the traffic sails under the British flag, and John Bull is in receipt of a pretty penny every year in the shape of dividends. Briefly, both for military and commercial reasons, the Suez Canal is a necessity to us, and I feel convinced that men of all parties are agreed that we must keep it open even if we have to "fight the thing out on that line all the summer."

## THE IRON MARKETS

have remained steadily strong, despite the unfavorable conditions to which I have just alluded, hence it is not unreasonable to assume that, with a clearer material and metaphysical atmosphere, we might have had quite a spurt. The whole of last week was characterized by much firmness, the lead of Glasgow being most faithfully followed by the whole of the other iron districts. To-day the markets are equally stiff, the very favorable nature of the Board of Trade returns having more than set off the more grave news of the day. In Scotland the statistical position is gradually improving, but it can not be said that much has happened as yet to justify any material augmentation of values.

Warrants are creeping up, nevertheless, and makers are increasing their quotations as occasion serves. You will doubtless have noticed that one or two brands are advancing more rapidly than their fellows. That is accounted for by the greater scarcity of No. 3 iron and by the larger local sales enjoyed in those instances. The home consumption of Scotch pig iron is maintained on a heavy scale, but as prices go up there can be no doubt that users will again resort to Middlesbrough's brands. There is, indeed, a certain margin within the limits of which the Scotch makers have scope, but so soon as their quotations exceed that margin, Middlesbrough's pig will again come in and they

will lose a share of the consumptive business. A natural equipoise is thus always in working order, and it may be counted as certain that James Watson & Co., who are the chief importers of Middlesbrough's pig into Scotland, will not allow any time to be wasted in bringing the check into action. Low figures in Scotland are unfavorable for the Cleveland smelters; this year to date the Scottish importations have decreased 40,000 tons, so that the item is fully worthy of attentive consideration. Below I give you statistics showing how the two districts stand, jointly and separately. In the Middlesbrough's district prices do not move for the reason just indicated, despite the good shipments and constantly decreasing reserve stocks. On the West Coast the hematite smelters boast of numerous sales, and express themselves confident as to the course of events during the next three months. They are gradually stiffening their prices and must be accounted to have progressed pretty rapidly, when one bears in mind that a couple of months or so ago they were glad to sell at 50/6 or 51/6, whereas they now decline to look at anything below 55 @ 56/6. They have made fairly large contracts with the home Bessemer concerns, but it strikes me as being curious, to say the least, that to-day Steel, Tozer & Hampton, of Sheffield, are advertising for 3000 to 5000 tons of Bessemer hematite pigs, to be delivered over August-December, as well as equal quantities for prompt use. Either they mean to break the market, or they have a real difficulty in getting supplies at what they deem fair figures. I suspect the former is the true interpretation of the enigma—which is worthy of consideration, seeing that these contracts are very rarely publicly advertised. In Staffordshire and other parts of the country crude irons are stiff, but business has been minimized by the near approach of the quarterly meetings. The tests of the Thomas-Gilchrist steel, made from Staffordshire cinder pigs, having proved fairly satisfactory, a meeting was held at Birmingham on Thursday last for the purpose of following up the matter in a commercial way. It was decided to form a joint stock company, to be styled "The Staffordshire Steel and Ingots Company, Limited," with a capital of £100,000, in £10 shares. Of that amount £25,000 was subscribed at the meeting, which was promoted by Messrs. Alfred Hickman, Bowker, Baldwin, Heathfield, and other members of the preliminary committee. There is no reason for doubting the ultimate success of the undertaking, provided it is managed as any large concern must be conducted to make it pay. You may expect to hear other adoptions of basic working before long. Messrs. Thomas and Gilchrist are both in Staffordshire, and are pushing forward their invention with much tact and energy. The works of the North Eastern Steel Company will not be ready this year, according to what I hear. In the finished iron trade I have little that is new to record, and it is not worth while indulging in anticipations, now that the quarterly meetings of the trade are within measurable distance. No change is likely to be made in the list prices of bars.

SCOTCH PIG IRON

has improved several pence per ton during the week, warrants being now 49/6, as against 46/10 to 47/10 this date last year. There are 108 Scotch furnaces at work (including 20 hematites) against 120 a year ago. In Connel's Glasgow stores there are 63,717 tons (a decrease of 520 tons on the week), as compared with 506,286 this date 1881, and 627,186 tons at Christmas last. Total shipments to date have been 315,026 tons, an increase of 35,742 tons, while importations of Middlesbrough's pig iron into Scotland have been 109,922 tons, a decrease of 42,912 tons to date. Writing from Glasgow, July 7, James Watson & Co. said: "We have to report a firm market for Scotch pig iron, with a fair business doing. On Monday the warrant market opened at 48 8/4, cash, and advanced to 49 1/2. On Tuesday, under the influence of favorable stock returns from Middlesbrough, the price improved to 49 1/2. On Wednesday the price fluctuated between 49 1/2 and 49 2. Yesterday business was done from 49 1/2 to 49 1/2. To-day the tone has been firm, warrants changing hands from 49 1/2 to 49 1/2, closing sellers, 49 1/2 buyers near. A good business doing in shipping parcels, and prices in most cases are higher than last week. The shipments last week were 15,324 tons, as compared with 13,095 tons for the corresponding week of last year." We quote:

No. 1, No. 3,  
Clyde..... 50 6  
Cotter..... 53 5  
Langhoar..... 53 6  
Tartshire..... 53 6  
Summerlee..... 53 6  
Calder..... 58 6  
Carrmoe..... 53 0  
Bengarrock, at Ardrossan..... 54 1  
Edington..... 51 6  
Dundee..... 51 6  
Shotts, at Lothian..... 60 0  
Kinloch, at Bo'ness..... 49 0  
Carron, at Grangemouth..... 50 6

G. M. B., at Glasgow..... 50 6  
Clyde..... 53 5  
Cotter..... 53 6  
Langhoar..... 53 6  
Tartshire..... 53 6  
Summerlee..... 53 6  
Calder..... 58 6  
Carrmoe..... 53 0  
Bengarrock, at Ardrossan..... 54 1  
Edington..... 51 6  
Dundee..... 51 6  
Shotts, at Lothian..... 60 0  
Kinloch, at Bo'ness..... 49 0  
Carron, at Grangemouth..... 50 6

John E. Swan & Bros., Limited, Glasgow, have issued an interesting set of figures relating to the Scotch and Cleveland (Middlesbrough's) pig-iron trades for the first half of this year. I give them as they stand for the benefit of your readers:

SCOTCH PIG IRON TRADE.

Production.

1881—Average number of furnaces blowing, Tons, calculated upon the official returns issued by the Scotch Board of Trade, Scotland, as at the 25th of December, 1881, 111, producing 36 tons  $\frac{1}{2}$  per ton, up to 22,750 tons per week, say till 2d July, 1881.

1882—Average number of furnaces blowing, 107, producing, say 20 tons  $\frac{1}{2}$  furnace, equal to 21,400 tons  $\frac{1}{2}$  week.

Average decrease of production in 1882, 133 tons  $\frac{1}{2}$  week, equal to 14.02%, total, 36,072

Exports.

1881—From 25th December, 1880, till 2d July, 1881..... 276,284

1882—From 25th December, 1881, till 1st July, 1882..... 315,026

Average increase of shipments in 1882, 143 tons  $\frac{1}{2}$  week, equal to 14.02%, total, 38,742

Consumption, Including Deliveries by Railways to England.

1881—From 25th December, 1880, till 2d July, 1881, say 27 weeks, at 880 tons  $\frac{1}{2}$  week..... 239,760

1882—From 25th December, 1881, till 1st July, 1882, say 27 weeks, at 12,280 tons  $\frac{1}{2}$  week..... 331,506

Average increase of consumption in 1882, 340 tons  $\frac{1}{2}$  week, equal to 38.28%, total, 91,800

## Stocks in Warrant Stores.

1881—25th December, Connel & Co..... 67,186

1882—1st July, Connel & Co..... 636,342

Increase in 1882.

1881—25th December, Ardrossan Store..... 2,600

1882—1st July, Ardrossan Store None.

Decrease in 1882.

1881—25th December, Ardrossan Store..... 2,600

1882—1st July, Ardrossan Store None.

Increase in stores, 24 tons  $\frac{1}{2}$  week, equal to 10.1%.

With Makers.

1881—25th December..... 291,346

1882—1st July..... 210,534

Decrease in 1882, 2788 tons  $\frac{1}{2}$  week, equal to 25.84%.

9,156

With Makers.

1881—25th December..... 291,346

1882—1st July..... 210,534

Decrease in 1882, 2788 tons  $\frac{1}{2}$  week, equal to 25.84%.

75,292

With Makers.

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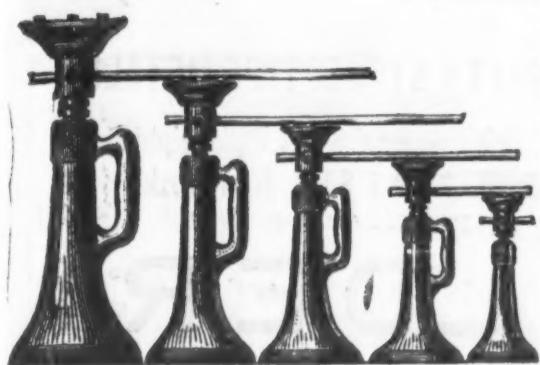
With Makers.

1881—25th December..... 291,346

1882—1st July



IF DEALERS WILL LOOK INTO THIS MATTER OF

**JACK SCREWS,**

They will find that ours are much better made than any others in market. And furthermore, by weight they are the cheapest. The same is true of our Bench Vises. We could cut down the weight one-quarter and it would hardly be noticed, but in using the Jacks under great strain somebody might get hurt. It is better for all concerned to make reliable goods, and sell them at a price based on quality, so that when they are put on the market they will stay. We guarantee the quality of all our goods, so that dealers take no risk whatever.

Diam. of Screw.	Length.	Net Price.
1/4	6 inches.	\$2.50
1/4	10 "	3.00
1/4	12 "	3.25
1/4	14 "	3.75
1/4	16 "	4.00
1/4	18 "	4.50
1/4	20 "	4.50
1/4	22 "	5.00
1/4	24 "	5.50
1/4	26 "	5.50
1/4	28 "	6.00
1/4	30 "	7.00
1/4	32 "	7.00
1/4	34 "	8.00
1/4	36 "	8.50
1/4	38 "	9.00
1/4	40 "	11.50
1/4	42 "	13.00

**MILLERS FALLS COMPANY**

74 Chambers St., New York.

**CHAMPLAIN**

Forged Horse Nails.

MANUFACTURED BY THE

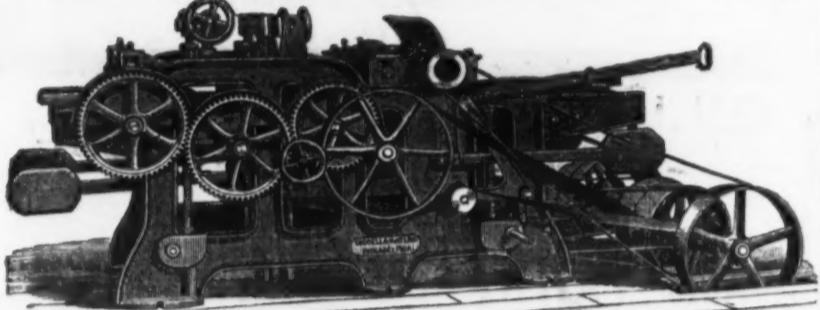
**NATIONAL HORSE NAIL CO.,**  
Vergennes, Vermont.

HOT FORGED AND COLD HAMMERED POINTED, MADE OF BEST NORWAY IRON AND WARRANTED.

WAREHOUSE

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DURRIE &amp; McCARTY. Sole Agents.

**Wood-Working Machinery.**

**HEAVY FOUR-SIDED CAR SILL PLANERS,**  
For Planing Mills, Railroad Shops, Car Builders, Cabinet, Carriage, Sash, Door and Blind Makers.

**GOODELL & WATERS,**  
SEND FOR CIRCULAR. Thirty-first and Chestnut Streets, Philadelphia, Pa.

**HANSON & VAN WINKLE,** Sole Agents for Weston Dynamo Electroplating & Electrotyping Machines, Newark, N. J.

For Nickel, Bronze, Brass, Copper and Silver Plating.

Over 1000 machines in use. Are used by all leading stove manufacturers.

Experienced men sent to put up machines and instruct purchasers.

INFRINGEMENTS.

We call attention to infringements of the Weston Machine in which Automatic Switches are used to prevent change of current. The Weston Co. are owners by grant or purchase of all forms of Automatic Switches for Plating Machines. The adoption of these machines will certainly lead to great loss to parties purchasing or using them.

MANUFACTURERS OF

Cast Nickel Anodes, Pure Nickel Salts, Polishing

Materials.

Manufactory, Newark, N. J. New York Office, 92 &amp; 94 Liberty St.

TO THE WHOLESALE AND JOBBING HARDWARE TRADE.

Send for descriptive Circular and Catalogue of

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AND OTHER HARDWARE SPECIALTIES.  
Manufactured by

**KYSER & REX,**  
Variety Iron Works.

Manufacturers of HARDWARE SPECIALTIES,  
IRON TOYS, NOVELTIES and HOUSE  
FURNISHING HARDWARE.

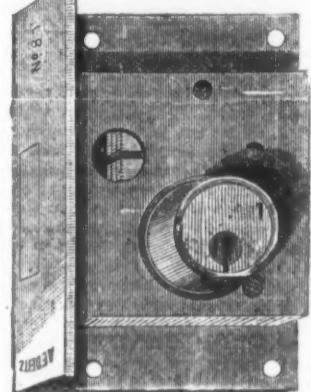
Main Office and Factory, **FRANKFORD, PHILA.**  
Sample Office, 33 South 4th St. Phila.

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MANUFACTURERS OF

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PAINT WORKS, 212, 214 & 216 Race Street. VARNISH WORKS, Kensington, Philadelphia.

**A. E. DIETZ,**  
(Successor to Barnes & Delta.)  
Manufacture of  
Store Door Locks, Night Latches, Padlocks, Drawer Locks &c., with Flat Steel Keys.



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97 Chambers & 81 Reade Sts., New York.

**THE FORSYTH SCALE CO.,**  
YOUNGSTOWN, O.

Manufacture a full line of

**FORSYTH'S STANDARD SCALES**  
Counter, Portable, Dormant,  
Stock and Hay, and

R. R. Track

**SCALES.**

Call Special Attention to their

**SUSPENSION HAY & R. R.**  
TRACK SCALES.

Also, Warehouse Trucks and Letter Presses.

PRINCIPAL WAREHOUSEES.

**FORSYTH SCALE CO.,** Chicago;  
**SIMMONS HARDWARE CO.** St. Louis.

**PRIZE MEDALLISTS:**

Exhibitions of 1863, 1865, 1867, 1872, 1873, and only award and medal for Noiseless Steel Shutters at Philadelphia, 1876; Paris, 1878, and Melbourne 1882.

**CLARK, BUNNELL & CO.,**  
LIMITED,

Late CLARK &amp; COMPANY,

Original Inventors and Sole Patentees of  
Noiseless Self-Coiling Revolving  
STEEL SHUTTERS,

FIRE AND BURGLAR PROOF. ALSO IMPROVED

ROLLING WOOD SHUTTERS,

Of various kinds. And Patent

**METALLIC VENETIAN BLINDS.**

Endorsed by the

Leading Architects of the World.  
Send for Catalogue.

Office and Manufactory,

162 & 164 West 27th St., N. Y.

**R. D. WOOD & CO.,**  
Philadelphia,  
Manufacturers of

**Cast Iron Pipe**

FOR WATER AND GAS,

Lamp Posts, Valves, &c.,

Mathew's Pat. Anti-Freezing Hydrants.

400 CHESTNUT STREET.

**TINUS OLSEN & CO.,**  
STANDARD SCALES  
AND

**Testing Machines.**

Manufacturers of all descriptions of Testing

Machines. Tests made daily.

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Buttonwood Sts., Philadelphia.

**HOWARD IRON WORKS,**  
BUFFALO, N. Y.,

Manufacturers of

**BOLT CUTTERS**

AND NUT TAPPING MACHINES,

(Schlenker's Patent.)

Send for Illustrated Catalogue.

**Whitman's Patent Americus,**

The best Cider and Wine

Mill made. Will make twenty per cent. more cider than any other mill.

Geared outside.

Will cut any logs as any first-class mill. Mincers, Corn Shellers, Feed Cutters, Feed Mills, etc.

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**WHITMAN AGRICULTURAL CO.**

ST. LOUIS, Mo.

**L. COES'**  
Genuine and Mechanics

**PATENT**

**ScrewWrenches**

MANUFACTURED BY

**L. COES & CO.,**

Worcester, Mass.

ESTABLISHED IN 1834.

REG. U. S. PAT. OFF.

MAY 4, 1869.

<div

## Standard Screw Threads on Cars.

At the annual convention of Master Car Builders, held last month at Philadelphia, Mr. M. N. Forney, as chairman of the committee appointed to "investigate and report on the present construction of screws and nuts used in cars," presented his report, from which we give our readers the following summary and extracts:

"The committee to whom this subject has been referred, and who have had it under consideration for several years, find that to give a clear understanding of it a brief historical review of what has been done is requisite. Without other introduction, then, it may be said that in 1864 the inconvenience and confusion resulting from the diversity in the screw threads used in machine and other construction was brought up for consideration before the Franklin Institute, of Philadelphia. A committee was then appointed to investigate and report on the subject. That committee recommended the system designed by Mr. William Sellers, and the Institute afterward adopted their recommendation. Practically the three systems from which they were obliged to choose were, first, the ordinary sharp V-thread, shown in Figs. 1 and 2. Fig. 1 represents a section of an inch bolt full size, and Fig. 2 a section of the thread enlarged eight times its actual size. Figs. 3 and 4 show Whitworth's thread, and Figs. 5 and 6 Sellers' system. The angle A and A' between the



Standard Screw Threads.—Fig. 1.—A Full Size Section of an Inch Bolt cut with a V-thread.

sides of the V-thread is generally 60°, although this is not uniformly so; when it is, the depth D, from the root of the threads to the point, is slightly less than seventh-eighths of the pitch. In the Whitworth thread the depth D is two-thirds of the pitch, and the top and bottom of the threads are then rounded as shown. The angles A and A' of the sides of the threads to each other are 55°.

In a report made in 1858 to the Chief of the Bureau of Steam Engineering of the United States Navy, by a board of engineers, the difference in the resistance to tension and torsion of bolts with Sellers' threads, compared with those having V-threads, was calculated, and the results obtained may be approximately summed up by the statement that the smaller bolts, with the Sellers' thread, have about a quarter more strength, the medium-sized ones a sixth more, and the larger ones an eighth more strength to resist tension than screws having an ordinary V-thread. The resistance to torsion of screws with the Sellers' thread is about a third, a quarter and a fifth greater than those with a V-thread."

These advantages of the Sellers' thread found recognition in their adoption as standard in the naval service, by the Master Mechanics, and lastly, by the Master Car Builders' Association. The report then goes on to say that unfortunately, though, when this was done, a large proportion of the members of the two last-named associations seemed to have the impression that the Sellers' system consists simply in a standard for the number of threads to the inch, and apparently not sufficient effort has been made to impress the fact on the minds of those who have the control of such matters that three features are essential to the Sellers' system:

1. Screws must have a given number of threads per inch.

2. The threads must be of the form and proportions designated.

3. The diameters of the screws must conform to the sizes specified.

A screw which does not conform to the Sellers' system in all three particulars has not a legitimate Sellers' thread. There is no such thing, for example, as a Sellers' screw 11-16 inch in diameter. That size is not rec-

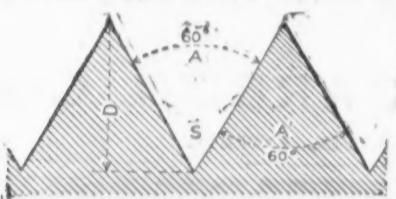


Fig. 2.—A Section of the V-thread Enlarged Eight Times.

ognized and has no existence in the system, and if a screw is made, as is often done,  $\frac{1}{4}$  inch in diameter, "a sixth-fourth" or "a thirty-second" large it ceases to be a Sellers' screw. Uniformity in diameter is as essential to interchangeability as uniformity in the number of threads per inch or the shape of the threads, and the importance of maintaining the former cannot be too strongly urged on this association. Just as soon as the practice is introduced of making screw threads "over-size," or a thirty-second or sixty-fourth large, interchangeability of bolts and nuts becomes impossible. If the Sellers' standard is adopted, no screws should be tolerated which are a fraction of an inch larger or smaller than the diameter specified for that system. But, while the form, proportions and dimensions of the standard screw threads were as definitely fixed by Mr. Sellers and the action of the Franklin Institute as it is possible for them to be, and although it was thus made plain what the standard screws should be, subsequent experience showed that it was not so easy as it appeared to make them conform with a sufficient degree of precision for practical purposes to the requirements laid down by Mr. Sellers.

In illustration of this, the report cites the experience with standard taps and dies on the Erie road: "In 1874 the Sellers' system

was adopted on the Erie road, and a set of standard taps and dies had been furnished to each of the shops on that line, which as they wore out were replaced by others made from the originals at each of the shops. In 1876 attention was called to the fact that some nuts cut at one shop would not fit bolts cut at others, and an investigation was

adoption. Besides being important that standards should be exactly right, it is essential that it should be possible to reproduce them to any extent that is desirable, even though the original was lost. This the Pratt & Whitney Company has supplied the means of doing.

The report then furnishes a brief description of the manufacture of tap or screw gauges: "The first step in making a tap or screw gauge is to turn a bar of steel to the exact diameter of the outside of the screw. Then each end of the portion on which the thread is to be cut is turned down to the diameter of the screw at the root of the thread. On the exactness of this first operation the precision of the ultimate size of the gauge or tap will depend. It is therefore essential to be able to measure exactly these two diameters. The next step is to cut the thread. To do this a tool must be ground which will cut a thread whose sides will have an angle of exactly 60° to each other. An amount equal to one-eighth of the pitch must be taken off the point of the tool, the flat portion being true to the sides of the thread. To make a true thread the tool must then be set so that its center line will be square with the axis of the screw. In order to be able to do this the sides of the tool are ground so as to be true parallel planes, and the parts which cut the sides of the thread are ground so as to be true with the sides of the tool and at an angle of 60° to each other. It can then be set true in a lathe with a square bearing against its sides, and against the blank tap or headstock of the lathe. What adds to the difficulty, though, is the fact that a cutting tool of this kind does not stand ver-



Fig. 3.—An Inch Bolt having the Whitworth Thread.

made. A set of nuts of the different sizes were cut at each of the shops, and were sent to Messrs. Pratt & Whitney, who fitted soft plugs made of Babbitt metal into each of these nuts. By taking at random a plug and a nut of nominally the same diameter, it was found that the one would rarely fit the other. It was seen that not only were the diameters different, but in many cases the pitch and angle of the threads had been altered from the original standard, and the taps made at different shops did not conform to each other. Nuts were taken from 23 or 24 foreign cars, and these not only were unlike their own screws, but were also unlike each other. Subsequent inquiry elicited the fact that the manufacturers of taps and dies had been working to different standards. Soon after the Sellers' standard was recommended by the Franklin Institute, a number of sets of their new standard screw gauges were made by Mr. Fox. One of these sets is at the Brooklyn Navy Yard, and others were bought by manufacturers of taps and dies, and were used as standards to which they worked, while the Pratt & Whitney Company undertook to work to what they regarded as a true inch, and the fraction thereof. As neither the inch nor the gauges were certainly known to be correct, it is not remarkable that the bolts and nuts cut with tools made by different manufacturers were not interchangeable."

The question came up which was right. The report then recites the successive steps taken in the efforts to procure a standard measure, which led ultimately to the connection of Prof. W. A. Rogers, of the Cambridge Observatory, with Messrs. Pratt & Whitney, and resulted in the production by that firm of a comparator, or measuring machine, from the plans of Professor Rogers, which in regard to accuracy seems to leave little to be desired, since it is capable of measuring 1-50,000th of an inch with absolute

accuracy, but at an angle of 20° to a perpendicular line. The top surface is horizontal. Now, if the portions of the tool which conform to the sides of the thread were ground with an angle of 60° to each other, the edges of a plane which intersects these sides at an angle of more or less than 90° would not be inclined at an angle of 60° to each other. For this reason the tool must be ground at an angle of somewhat less than 60°, so that the cutting edges formed by the intersection of the flat top surface and the inclined edges of the tool will be exactly 60°.

"It would be impossible, without elaborate illustrations, to give a description of the delicate instrument which is used to measure the exact amount which should be taken off the point of the tool for cutting threads of various sizes. It must be sufficient to say that this is done with the highest degree of precision. These processes and appliances are required to make a turning tool of the exact shape and size to cut the threads of screw gauges. With such a tool, then, and a blank for a gauge such as has been described, it would seem that by cutting the thread so that the point of the tool will just touch that part of the blank which has been turned down to the size of the screw at the root of the thread, the screw must be of exactly the right size. If, as has been said, all the work described has been done with absolute precision, such will be the case; but in order to verify it, the same tool used for cutting the thread is put into a planer or shaping machine, and a template is cut with it out of a thin piece of steel. The space cut out of the steel plate will, of course, be an exact duplicate of the space between the threads. As the spaces at the root of the threads should be exact counterparts of the point of the threads themselves, the latter can be measured by the template, and if they are exactly alike it will indicate that all the operations have been performed with the required precision. If so, the screw thus made supplies a true gauge to work to. It should be kept in mind that the sides of the threads of a screw are, or should be, the actual bearing surfaces, and that in making taps and dies, the threads should be measured over the sides. With such a gauge as will be supplied by the screw described, it is an easy matter to set an ordinary pair of calipers over the sides of the threads, and then reproduce that size in any number of other screws or taps. A skillful tool maker will measure with ordinary calipers to within 1-2000th of an inch, provided he has a correct gauge to set his calipers by. Experience has shown that with a gauge of the kind described to work from, a very high degree of precision can be attained, but it was also found that it was always necessary to make an allowance for the wear of the

tool.

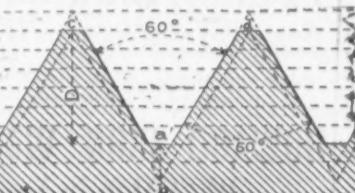


Fig. 4.—A Section of the Whitworth Thread Enlarged Eight Times.

cutting tool which occurred when it was first used, and therefore to make it somewhat larger than the actual size of the thread.

"But there is still another difficulty with screw gauges. If they are made as described, the steel must, of course, be soft, and a very little use would soon destroy their accuracy. It is therefore requisite that working gauges should be hardened. The process of doing so, however, changes their form and dimensions slightly, so as to destroy their accuracy. To get over this difficulty hardened gauges are made somewhat larger than the standard size. The Pratt & Whitney Company have devised a plan to grind these gauges, after they are

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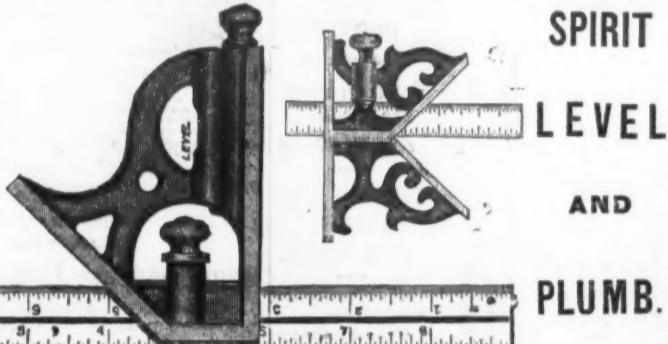
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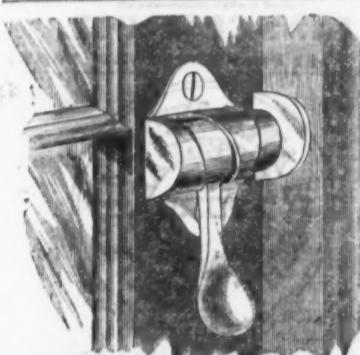
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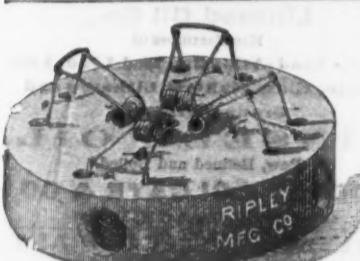


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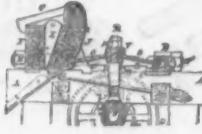
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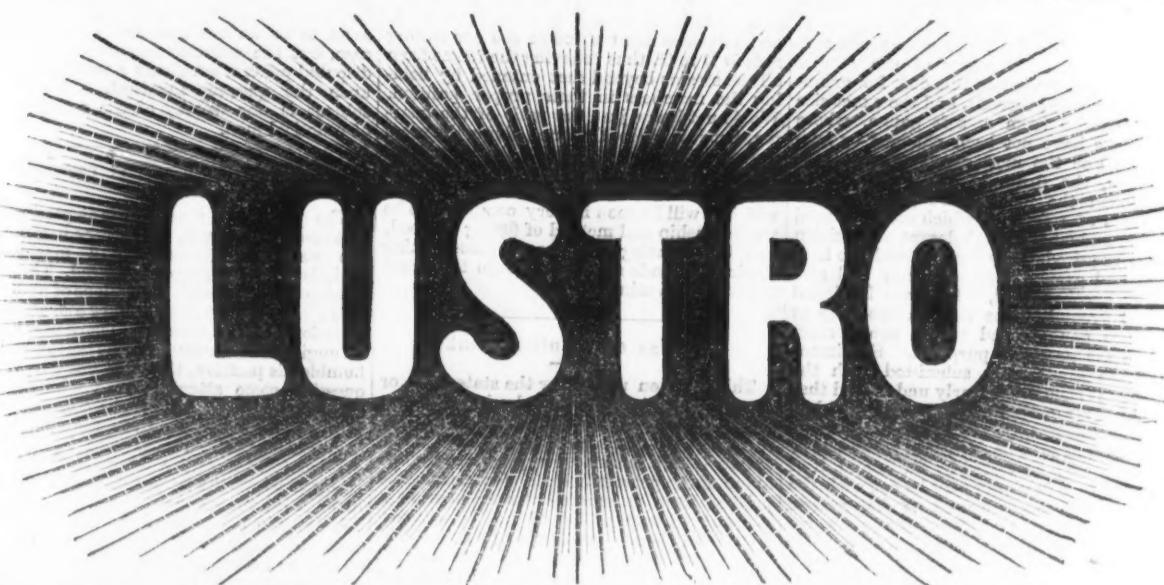
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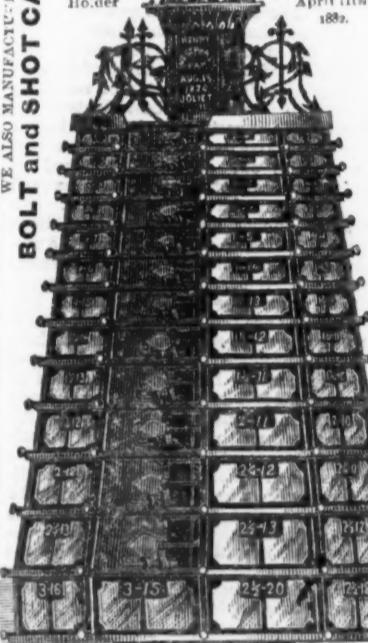
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deal of trouble. The front frames can be taken out  
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You have no Drawers to take out or put back.  
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In our Case only ONE COMPARTMENT is open at the  
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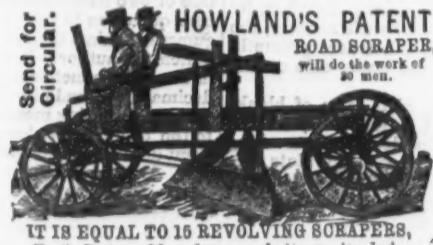
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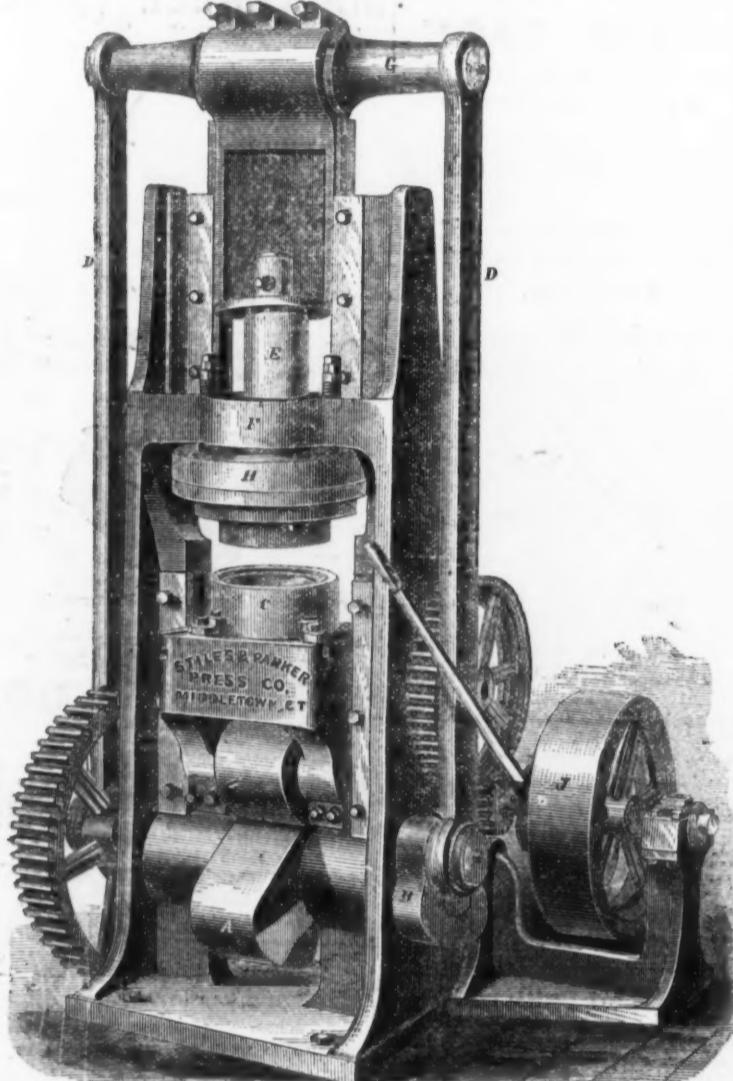
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hardened, to the exact size, form and pitch. To do this the gauges are put into a lathe, and a rapidly revolving steel disk or wheel is attached to the tool holder, which is moved by the lead screw, whose pitch is exactly that of the screw of the gauge. Diamond dust is used on this disk for grinding the hardened threads, and the exact size is reproduced from a soft gauge, whose dimensions have not been changed by hardening. For the most exact standards of reference, the Pratt & Whitney Company recommend the unhardened gauges. For standards of reference which must be used often, and where a high degree of precision is also required, they recommend the hardened and ground gauges. They will also furnish another kind, which are hardened but not ground, to be used in the shop as reference gauges, and which are correct enough for practical purposes. Specimens of all the kinds were submitted with the report. It should be clearly understood that none of these gauges are intended for shop use, and that if subjected to much wear their accuracy will soon be destroyed. The size of new taps may be tested by them, and, if of correct size, a few nuts may be cut with the new taps, and these be used as shop gauges by the workmen. As these wear they can be replaced with new nuts cut with other new taps."

The report concludes with the following recommendations:

"That this Association deprecate the use of screws larger or smaller in diameter by a small fraction of an inch than the sizes specified for the Sellers or Franklin Institute



Drawing Press, Built by the Stiles & Parker Press Co., Middletown, Conn.

system, and that all its members are urged to abandon entirely the use of over or under size screws."

"That the thanks of this Association be voted to the Pratt & Whitney Company for the intelligence, liberality and enterprise shown in their efforts to establish a system of accurate gauges for screws and for tools for precise measurement."

"That the committee which prepared this report be instructed to send a copy of it with a suitable circular, calling attention to the importance of adopting the correct standard Sellers system of screw threads to the presidents, managers, superintendents and master car builders of the United States, Canada and Mexico, and that when the committee has performed that duty it be discharged."

#### A New Drawing Press.

We illustrate above a new drawing press by the Stiles & Parker Press Company, Middletown, Conn. The press is one combining great power and solidity with comparatively light weight, the strains of drawing and cutting being taken upon the connecting rods, and not passing in any way through the frame of the press itself, this construction of course greatly reducing the necessary strength of framing, and consequently lightening the press. In making ordinary work the blank is cut and formed at a single operation. The lower slide or die holder is carried or rests upon the cam A on the main shaft, and rises or falls as the cam revolves. This cam is so made that when the slide is raised to the proper height after cutting the blank, there is a dwell of sufficient length to enable the upper slide or plunger E to force the blank into shape. On the main shaft B two cranks are formed, which are connected by the rods D D to the upper cross-head G. The motions of these cranks are thus communicated to the cross-head, which in turn raises and lowers the plunger E and the blank holder H. The upper and lower slides are adjusted by means of Stiles's patent eccentric adjustment, which enables the press to be set with the greatest accuracy for different thicknesses of metal. J is the balance wheel and driving pulley, and is connected to the press by a friction

clutch arranged to "stop up," that is, to leave the press at the highest point of the stroke. It will be seen at a glance that the strain comes on the shaft, which is of steel, and is transmitted through the connecting rods D D to G, thus relieving the frame from all the strains beyond that entailed by holding the members in their proper position. We do not know just the ratio of the gearings, but it is evidently large, giving the press very great power. Many of the largest establishments in the country doing work in heavy metals are using this form of press, which it will be seen is very compact. The workmanship and method of fitting is good, and the wearing surfaces or those taking strains are made sufficiently large to reduce the wear to a minimum.

#### The Use of Printed Blanks.

This is often urged for the statement, or record, of ordinary routine business of machine shops, and all similar places, but the real value of such appliances as actual labor-savers is not known or appreciated by one in ten of the persons actually concerned. The printed form is generally looked upon as a piece of red tape, useless to the "practical" man, and hence avoided whenever and wherever it possibly can be, whereas the real fact is that it ought to be used habitually for the statement of every transaction or detail of work which is a matter of regular occurrence, whether daily, weekly or monthly. It is true enough that the use of any form of bookkeeping, or of any number of printed

calculations shall be made in such form that he, without preparatory study, shall be able to understand them, that is, that no one shall be permitted to make them at all. This may seem to be an extreme way of putting the case, but the extreme method of stating a disputed point often sheds a wonderful light upon the question involved. The whole subject is one worthy of the consideration of practical men.

#### Standards of Measurement.

The question of standards is at present one of absorbing interest. At every meeting of the various engineering and mechanical societies standards are considered. The technical press teems with discussions of standard screw threads, standard gauges and standard sizes for different articles. There is scarcely an engineer or mechanic in the land, however humble his position, that has not given this question some attention, and who has not some ideas upon the subject. The necessity for uniform sizes, accurate fits and interchangeable parts, is too well known and appreciated to require argument. All are ready to admit the desirability of a standard in each of the several directions in which standards may be discussed, however much they may differ among themselves as to what the several standards shall be, or what means shall be employed in establishing a standard.

The real question, therefore, is not with reference to standards in the abstract—the expediency of employing standards—but, rather, what shall be used as a standard in each of the several departments, and what means are best to employ in producing and duplicating the standard when it has been selected. These, at first, seem simple matters, and without consideration one is surprised that long years of labor and large sums of money should have been expended in attempts at solution. The refinement of accuracy embodied in much of the mechanism of the present day, requires almost infinitesimal differences. Inch gauges, which differ between themselves the thousandth of an inch, are unfit for use in most places. The difference of a ten-thousandth of an inch between two yards is a matter of sufficient importance to warrant the best efforts of the ablest scientific investigators in an endeavor to show which is correct and which is in error.

The yard is our accepted standard of length, but we cannot measure with the yard alone. We must have it subdivided. We require feet, inches, and even small fractions of an inch. Given a standard yard, the mechanical problem of its accurate subdivision is presented. What are the means to be employed to accurately divide its length into such spaces as are required in small measurements, and how are the equivalents of those spaces to be produced in the shape of gauges, plugs, rings and the like, as are required in practical work? These questions are largely problems of mechanical detail of machine design and construction, and are to be considered in a measure, independent of the method or scheme upon which it is undertaken to divide the yard. The same method may be variously embodied in devices which may be made to facilitate the solution of the problem. No two investigators are likely to see entirely alike as to requirements in matters of this kind, and scarcely any two designers or constructors would employ means identical in all particulars for producing the results specified, even though working upon the same scientific method. There is room for discussion at every step of the way.

#### NEW PUBLICATIONS.

STANDARD MEASURES OF THE UNITED STATES, GREAT BRITAIN AND FRANCE. By Arthur S. C. Wurtzel. Pamphlet. Published by E & F. N. Spon. Price, 50 cents.

This little book, by a member of the Society of Civil Engineers, is very timely, and contains much that will be of interest to those who are investigating the subject of fine measurements and standards. It contains the history of standard measures from their introduction in 1756 by the Royal Society up to the present time, with actual comparisons of the measures made at various times in the United States, Great Britain and France. The origin of the meter and comparative results, according to Delambre, Bessel, Airy and Clarke, are presented. Tables showing the reduction of the French toise into English feet, the meter into inches, and the length of the seconds pendulum, as given by different writers, are also presented. The appendix to the pamphlet contains the "disadvantage in the practical use of the metrical system, and the inconvenience attending its adoption," as they appear to the author. One or two paragraphs in the appendix will prevent them, if applied with intelligence, as the work progresses; for then, by daily comparison one day with another, the foreman or manager can trace promptly any tendency toward the losing side of the account.

Proceedings of the Engineers' Club, of Philadelphia, for March, 1862.

This pamphlet is No. 1, Vol. 3, of the proceedings of an engineers' club that is becoming well known throughout the country. The opening article is the annual address of the president. The frontispiece is a portrait of Mr. Strickland Kneass, the retiring president, and as a piece of art work is very good. It is of the style of picture known as

a prototype, and was done by F. Gutekunst, of Philadelphia. Following this is the opening address of Rudolph Hering, president for the current year. The principal papers contained in this number are, first, "On the Relative Tensile Strengths of Long and Short Bars," by Prof. W. S. Chaplin. This is illustrated with diagrams and accompanied by tables. The succeeding paper is "How to Establish a True Meridian," and is by Prof. L. M. Haput. This is also illustrated by diagrams. The annual report of the secretary and treasurer, notes and communications, abstract of minutes of meetings, contributions to the library and a list of members complete the work.

The Board of Managers of the American Iron and Steel Association met at Cresson Springs, Pa., on the 25th inst., and adopted a call for a general convention of all iron ore producers and iron and steel manufacturers in the United States, to meet thereon on Tuesday, September 12, to consider the duties on iron and steel and iron ore, and prepare a report thereon, to be submitted to the Tariff Commission. In the meantime, it is recommended to the various local iron and steel organizations in the country that they meet and consider the duties in which they are respectively interested.

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We find the following measures in use in addition to the decimal divisions—double meter, demi-decameter, double meter, demi-meter, and double decimeter." The final paragraphs in the appendix are as follows: "In past centuries all the work and records of English speaking peoples, now numbering 100,000,000, and increasing and progressing faster than all other nationalities, as well as being closely connected by descent and business, have been done and recorded under the yard system, and any change now would unavoidably render necessary continual reduction, to the great detriment and inconvenience of the mass of our people, and with little or no practical benefit except, perhaps, to a small class of scientific and pseudo-scientific people, who can and do amuse themselves with the fancied uniformity of the meter. All our numerous text-books and tables, mechanical and scientific, would be rendered entirely useless by the change, and this is a serious final consideration."

The only Cylinder Tumbler Locks made. No screws or nails required in a plating. Extra long throw of bolt. Elegant finish, and great security.

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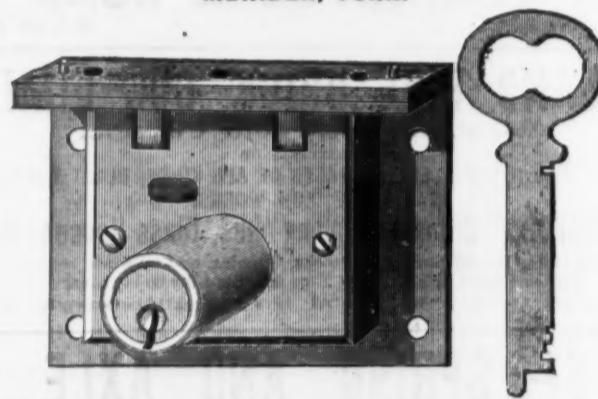
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The above, genuine goods are  
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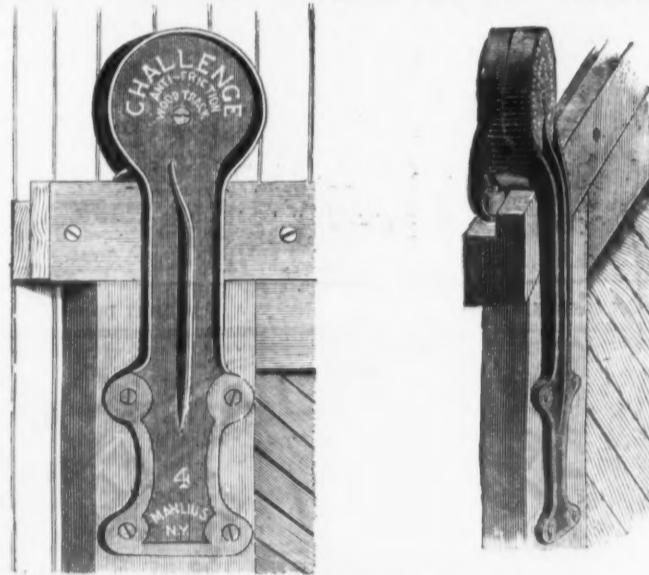
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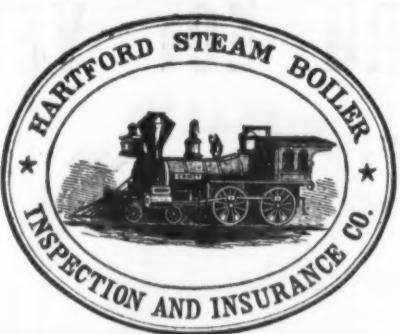
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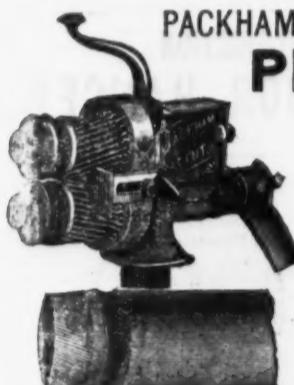
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They are fine in appearance, durable and very  
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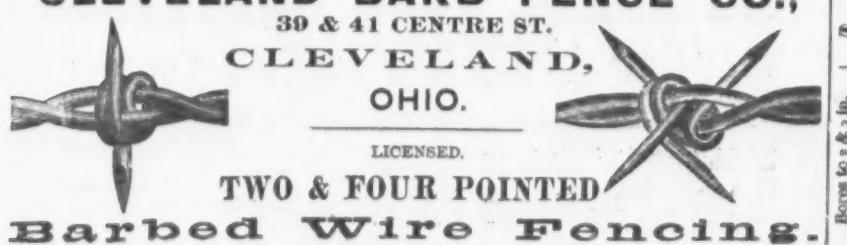
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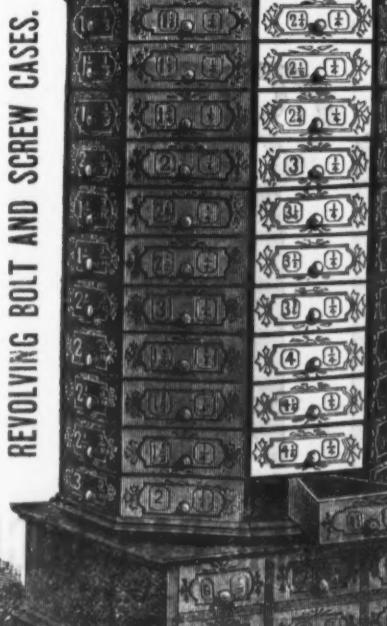
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Successors to W. R. Baker & Co.

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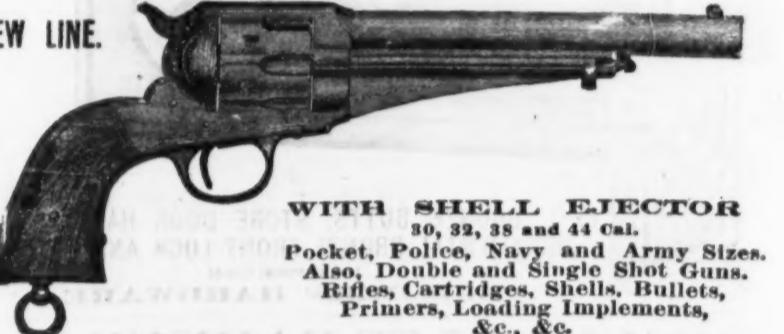
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For Coaches, Phaetons, Buggies, Wagons, &c.

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**Belt Pulleys.**  
A. & C. M. & Co., Easthampton, Conn. .... 35

Belt Robt. & Co., Chester, Pa. .... 43

**Belt Hoops.**  
Clevine, S. & Co., Chambers, N. Y. .... 3

Hovey & Co., Springfield, Mass. .... 27

Springfield Glue and Emery Wheel Co., Springfield, Mass. .... 27

**Bird Cases.**  
Guthrie G., 46 Park Place, N. Y. .... 3

Linderman O. & Co., 241 Pearl, N. Y. .... 3

Maxheimer John, 241 Pearl, N. Y. .... 3

**Bird Cage Manufacturers.**  
Felt & Beiting, P. & Co., Park Row, N. Y. .... 16

Fox & Remond, Cleveland, O. .... 27

Shultz Belting Co., St. Louis. .... 24

Whelby R. T., Chicago, Ill. .... 33

**Bicycles.**  
Bicycle Mfg. Co., 97 Washington, Boston. .... 44

The Tricycle Mfg. Co., Springfield, Ohio. .... 18

**Bird Cases.**  
Bird Cases, Makers of. .... 3

Alford Ward, Steamport & Co., 77 Chambers, N. Y. .... 35

F. & B. Belting and Packing Co., 2 Park Row, N. Y. .... 16

Fox & Remond, Cleveland, O. .... 27

Mitlers Falls Co., 74 Chambers, N. Y. .... 25

Whelby R. T., Chicago, Ill. .... 33

**Bird Cage Manufacturers.**  
Felt & Beiting, P. & Co., Park Row, N. Y. .... 16

Fox & Remond, Cleveland, O. .... 27

Mitlers Falls Co., 74 Chambers, N. Y. .... 25

Whelby R. T., Chicago, Ill. .... 33

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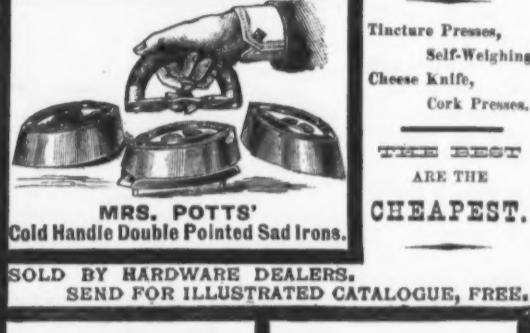




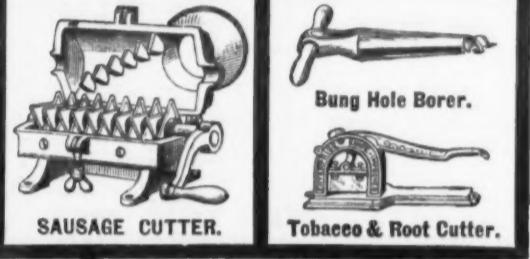
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Self-Measuring Faucet.

Twenty different sizes from \$2 to \$100  
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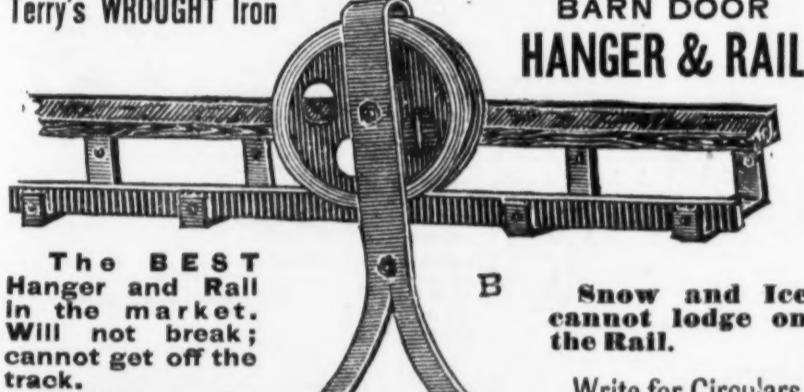


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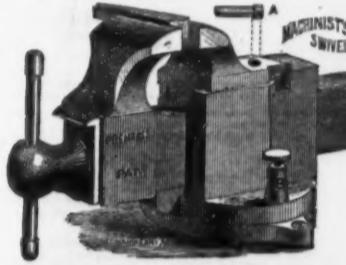


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Terry's WROUGHT Iron

The BEST  
Hanger and Rail  
in the market.  
Will not break;  
cannot get off the  
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As cheap as the  
best cast iron.

TERRY MFG. CO., Dundee, N. Y.

PRENTISS' PAT. VISSES,  
Adjustable Jaw.  
Stationary or Pat. Swivel Bottoms.  
ADAPTED TO ALL KINDS OF VISE WORK. ALSO  
"PEERLESS" SWIVEL PIPE GRIP,  
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**Wrought Iron Butts, Hinges**  
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**DOOR BOLTS,**  
Plain, Japanned, Bronzed and Plated.  
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MANUFACTURERS OF  
Horse, Mule & Snow Shoes of the Perkins Pattern.  
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F. W. CARPENTER, President. C. H. PERKINS, Gen'l Manager. E. W. COMSTOCK, Secretary

**Bemis & Call Hardware & Tool Co.**  
PATENT COMBINATION WRENCH.  
These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, case-hardened throughout, and not only combine all of the superior qualities of our Cylinder or Gas Pipe Wrenches, but also all requisite Combinations of a regular Nut Wrench thus making a combination which has no equal.  
For Circulars and Price List, address  
**BEMIS & CALL HARDWARE & TOOL COMPANY, Springfield, Mass.**

## The "Eureka" Pipe Cutter

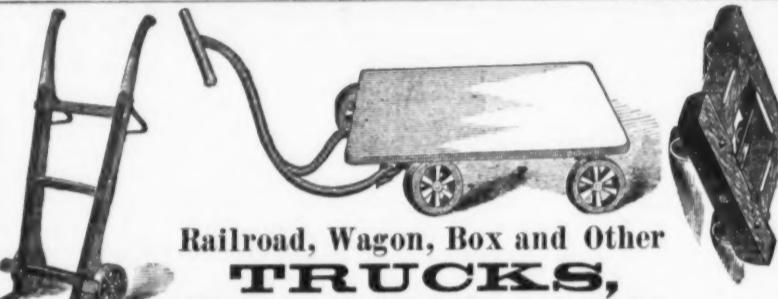


THE BODY—is fitted with an adjustable Cast-Steel Jaw at the point where it comes in contact with the Pipe, which Jaw can be renewed at any time by simply removing one screw. By this system the wearing away of the Jaw (which in other cutters is the first part to give out) is effectually prevented, and this tool can be kept in first-class order at all times.

THE WHEEL BLOCK.—This is also of Steel, neatly fitted to its socket and cannot be dropped out. It is much more durable than the cast-iron blocks and is hardened at the point where the rod comes in contact with it.

THE HANDLE—of this Cutter is put on to stay, and cannot be removed by the roughest usage, as it is an iron handle, cast fast to the Rod, operating the block.

MANUFACTURED BY

243 & 245  
SOUTH THIRD  
STREET  
PHILADA.

Railroad, Wagon, Box and Other  
**TRUCKS,**  
Made in all Varieties and Sizes,  
Timber Well Seasoned, Well Ironed and Substantially Framed.

Please send for Prices and Sample Orders. A trial will secure your custom. Price Lists of Scales and Testing Machines furnished free upon application.

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SPECIALTY: LARGE CIRCULAR SAWS.

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**STEPHENS**  
PATENT VISE.

The most durable, and the only solid quick working Vise, with automatic taper jaw attachment.

Will very soon pay for itself, in saving of time and labor.

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**Handles and Spokes,** NEW YORK  
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ALL MAKES OF  
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Stretchers, Diggers, Staples, &c. And  
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The Great Railroad Paint.

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CHAMPION HOG RINGER RINGS AND HOLDER. Only double ring ever made. The Ring that will effectively keep Hogs from rooting. No sharp points in the nose. BROWN'S HOG AND PIC RINGER AND RINGS. Only single Ring in the market that closes on the outside of the nose. No sharp points in the nose to keep it sore.

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CHAMBERS, BERING & QUINLAN, Exclusive Manufacturers, Decatur, Ill.

BUTLER & COLDEY MFG. CO., Limited, MANUFACTURERS OF

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**WILCOX & HOWE, Birmingham, Ct.,**

**Carriage Hardware.**

(See The Iron Age first issue of each month.)

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Perfection Window Cleaners can be procured in any quantity from the leading Hardware, Woodenware and Rubber Houses of this country and Europe. Among whom are the following.

EASTERN RUBBER CO., Boston, Mass.  
GOODYEAR'S RUBBER MFG. CO., N. Y. City.  
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CREIGHTON & SON, Louisville, Ky.  
KIPP BROS., Indianapolis, Ind.  
FELIX, MARSTON & BLAIR, Chicago, Ill.  
GOULD, HALL & CO., Chicago, Ill.  
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HALL & WILLIS HDW. CO., Kansas City, Mo.  
GORDON HARDWARE CO., San Francisco, Cal.  
A. F. CONANT, London, Eng.  
FRED'K ORME & CO., London, Eng.  
THO. BRYAN, London, Ont.

Dealers will be careful to ask for the Perfection Window Cleaner, and take no other, as all others are infringements which we shall promptly suppress. See that all have two rubbers and bear our name and date of patents.

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### GRAY IRON CASTINGS.

JOHN KEPELMAN, Reading, Pa.,  
Herewith gives notice that he has opened a Jobbing Foundry, and is ready to receive orders for all kinds of Light Gray Iron Castings; also, for every description of Machinery. Orders promptly filled. Please address

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GRINDSTONES.

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The largest manufacturers in the world of

**OIL STONE** STONE

Of all description.

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ALL SIZES & GRITS

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Imports and Dealers in all kinds of

**GRINDSTONES,**

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Stones for Masons, Carpenters, Farmers and

Glass Cutters &c. made to order.

## New York Wholesale Prices, July 26, 1882.

## HARDWARE.

<b>Bufts</b>		
Wrought Brass.		dis 64 & 10
Cast Brass, 12 oz. B.		dis 33 & 10
Cast Brass, Corbin's Fast Joint.		dis 10 & 10
Cast Brass, Loose Joint.		dis 10 & 10
Fast Joint, Narrow.		dis 10 & 10
Fast Joint, Broad.		dis 10 & 10
Loose Joint.		dis 10 & 10
Loose Joint, Japanned.		dis 10 & 10
Loose Joint, with Acorus.		dis 10 & 10
Loose Joint, Japanned, with Acorns.		dis 10 & 10
Parliament Butts.		dis 10 & 10
Mustard Butts.		dis 10 & 10
Loose Pin, no Acorns.		dis 10 & 10
Loose Pin, Acorus.		dis 10 & 10
Loose Pin, Acorns, Japanned.		dis 10 & 10
Loose Pin, Acorns, Japanned, Plated Tips.		dis 10 & 10
WROUGHT IRON.		
Fast Joint, Narrow.		dis 40 & 10
Fast Joint, Lt. Narrow.		dis 40 & 10
Fast Joint, Broad.		dis 40 & 10
Loose Joint, Broad.		dis 45 & 10
Table Butts, Back Flaps &c.		dis 40 & 10
Inside Blind, Regular.		dis 40 & 10
Inside Blind, Light.		dis 40 & 10
Loose Pin, W.		dis 15 & 10
Loose Pin, Light.		dis 10 & 10
Spring Hinges:		
Geer's Spring and Blank Butts.		dis 25
Sabin Mfg. Co.'s Double Acting		dis 25
Uni-n Spiral Spring, Japanned.		dis 25
Union Spiral Spring, Ornamental.		dis 25
Union Spring Hinge Co.'s.		dis 25
American Spring Hinge Co.'s.		dis 25
Spring Hinges.		dis 25
Union Mfg. Co.		dis 25
Bommer's		dis 25
Buckman's		dis 25
Blind Butts, Parker.		dis 70 & 2
Blind Butts, Palmer.		dis 45 & 10
Blind Butts, Seymour.		dis 70 & 2
Blind Butts, Shepard's Double Locking.		dis 70 & 2
1 & 2.		dis 70 & 2
Blind Butts, Shepard's Noiseless, Nos. 10 & 12.		dis 70 & 2
Blind Butts, Lull & Porter.		dis 65 & 10
Blind Butts, Nicholson.		dis 45 & 10
Blind Butts, Huffer.		dis 10
Blind Butts, Clark's, Nos. 1, 2, 3, 4, 40, 45 and to 10.		dis 70 & 2
Blind Butts, Clark's, Nos. 1, 2, 3, 4, 40, 45 and to 10.		dis 65 & 10 & 10
Blind Butts, Sargent's, No. 12.		dis 65 & 10
Blind Butts, Reading's Gravity.		dis 65 & 10
Clark's Im-proved Shutter Hinge, Nos. 1, 116, 2, 24 & 4.		dis 60 & 10
Bew Pins.		
Humason, Beckley & Co.'s.		dis 25 & 5
Sargent & Co.'s.	\$19.70 and \$21.40, dis 60 & 10	
Butcher's Cleavers.		
Humason & Beckley Mfg. Co.		dis 25
Bradley's		dis 25
Bessie's.		dis 25 & 5
1 2 3 4 5 6 7 8		
Universal.	30.00 31.50 33.50 35.50	
Can Openers.		
Messenger's Comet.		dis 25
American.		dis gross 87.50, dis 10
Duplex.		dis 250, dis 15 & 25
Lyman's.		dis 25 & 15, dis 20
No. 4. French.		dis 22.5, dis 15
No. 5. Iron Handle.		dis gross 87.50, dis 10
Eur. ka.		dis 25 & 10, dis 10
Sardine Scissors.		dis 25 & 10, dis 10
Star.		dis 25 & 10, dis 10
Sprague No. 1, \$1.00; No. 2, \$2.25; No. 3, \$2.50.		dis 25 & 10
"Worlds Best" * gross, No. 1, \$12; No. 2, \$15.		dis 25 & 10
3. \$35.		dis 10
Universal.	dis 25 & 10	
Domestic.	dis 25 & 10	
Cane Perfection.		
Hicks & Goldmark's		
F. L. Waterproof 1-10'.		5 c
E. B. Ground Trim Edge, 1-0'.		60
E. B. Ground Trim Edge, Central Fire, 1-10'.		70
Pistol Waterproofer, extra heavy, 1-10'.		81.40
Musket Caps, 1-10'.		dis 10
U. M. C. F. C. trimmed.		dis 10
U. M. C. F. L. ground.		dis 10 & 10
U. M. C. Fire ground.		70
U. M. C. Double W. Proof.	\$1.40	dis 10 & 10
G. D. & S. B.		330, dis 10
Double Waterproofer, in 1-10'.	\$1.40	dis 10
F. L. Trimmed, 1-10'.		70
E. B. 1-10' trimmed.		dis 10 & 10
E. B. 1-10' ground edge.		70
Musket, in 1-10'.		dis 10 & 10
Cartridges, Rim.		
Central Fire.		dis 10
Cards—Horse and Curry.	new list, July 1st,	dis 10
Cotton.	new list, July 1st,	dis 10
Wool.	new list, July 1st,	dis 10
Carpet Stretchers.		
Cast Steel, Polished.		dis 25 & 10
Cast Iron, Steel Points.		dis 25 & 10
Bullard's.		dis 25 & 10
Casters.		
Plated and Shallow Socket.		dis 25 & 10
Deep Socket.		dis 25 & 10
Martin's Patent (Phoenix).		dis 25 & 10
Cartoon Leaders.		
Humason, Beckley & Co.'s.		dis 25 & 10
Sargent's.		dis 25 & 10
Chain.		
Trace, 6x 10-2.		dis pair 25
Trace, 6x 10-3.		dis pair 200, dis 35
Trace, 7-10-2.		dis pair 80
German Halter Chain, list of Dec. 31, 1881.		dis 45 & 50
German Coil, list of Dec. 31, 1881.		dis 45 & 50
Albert Halter, Hatching and Breast.		dis 45 & 50
Onside Chain, old list.		dis 45 & 50
Galvanized Pump Chain.		dis 45 & 50
Jack Chain, Iron.		dis 45 & 50
Jack Chain, Brass.		dis 45 & 50
Chalk.		
White.		dis gross for net
Red.		dis gross for net
Blue.		dis gross \$1.00 net
White Crayons.		dis gross 9c net
Chisels.		
socket Framing, Crossman.		dis 64 & 4
socket Framing, Arlington Edge Tool Co.		dis 64 & 4
socket Framing, Buck Bros.		186 list, 25 & 10
socket Framing, Merrill.		dis 64 & 4
socket Framing, Witherby Tool Co.		dis 64 & 10
socket Framing, Douglass.		dis 64 & 10
socket Firms, Crossman.		dis 65 & 5
socket Firms, Arlington Edge Tool Co.		dis 65 & 10
socket Firms, Buck Bros.		176 list, dis 25 & 10
socket Firms, Merrill.		dis 65 & 10
socket Firms, Witherby Tool Co.		dis 65 & 10
socket Firms, Douglass.		dis 65 & 10
Angled Firms.		dis 65 & 10
Angled Firms, Butcher's.		85.0000 85 to 10
Angled Firms, Spear & Jackson's.		5.00 to 10
Angled Firms, Buck Bros. (Shank).		5.00 to 10
Clamps.		
iron, Providence Tool Co.'s Wrt. Iron.		dis 25
iron, Adjustable, Gray's.		dis 20
iron, Adjustable, Lambert's.		dis 20
iron, Adjustable, Lamb's.		dis 45 & 5
iron, Adjustable Hammer's.		dis 45 & 5
iron, Adjustable, Stearn's.		dis 45 & 5
iron, Cabinet, Sargent's.		dis 65 & 10
iron, Carrage Makers', Sargent's.		dis 65 & 10
Clips, 3 x 6.		dis 40 & 5
forway or Best.		dis 40 & 5
uperior.		dis 40 & 5
Coc Hods.		
crimths.		dis 135 & 5
Cockey.		dis 135 & 5
Crane, Brass.		dis 135 & 5
Jacking, new list, July 10, 1880.		dis 40
Lobe, new list, July 10, 1880.		dis 40
Plain Bibs, new list, July 10, 1880.		dis 40
ale and Beer, new list, July 10, 1880.		dis 40
Coffe Mills.		
Webb's Patent.	\$9.50, \$10.50,	dis 25 & 10
American (Enterprise Mfg. Co.).		dis 25 & 10
French Steel.		dis 25 & 10
English Steel.		dis 25 & 10
Cast Iron.		dis 25 & 10
Combined Dinner, all and Lanterns.		
over doz. \$1.00.		dis 30
Compasses.		
Altimers.		dis 45 & 5
Dividers.		dis 45 & 5
Compass & Call Co.'s Dividers.		dis 65 & 5
Compass & Call Co.'s W. Inside or Outside.		dis 65 & 5
Compass & Call Co.'s (Call's Patent) Inside.		dis 65 & 5
Xcelar.		dis 50 & 5
Miller's Patent.		dis 25 & 5
Coopers' Tools.		
Bradley's.		dis 15 & 20
art's.		dis 15 & 20
Corkscrews.		
Humason & Beckley Mfg. Co.		dis 33 & 5
rough' Wire.		dis 25 & 5
Corn Knives and Cutters.		
Adsworth's.		dis 10
Crew Bars.		dis 25
on Steel Points.		dis 25
Curling Irons, &c.		
\$9.40 in., \$1.00, 2.00, 2.40.		dis 10
curling Irons.		dis 10
Curry Combs.		
new list.		dis 50
otchkis Novelty, new list, July, 1880.		dis 25
otchkis Excl. Supr. Champion.		dis 25
awrence "Perfect."		dis 25 & 5
ubber.		dis 25 & 5
Curvina Pins.		
vered Glass.		net
ette Enamel.		net
Cuttery.		
eriden Cutlery Co. (Table).		dis net
n. Miller Bro's. Cutlery Co.		dis 25
ason & Corbin's Pocket.		list net
angatuck Cutlery Co.		list net
os Burginshaw's Pocket.		dis 25

Hickory Firmer Chisel, assorted.	2 gross.	\$4.50
Apple Firmer Chisel, assorted.	2 gross.	5.00
Apple Firmer Chisel, large.	2 gross.	6.00
Socket Firmer Chisel, assorted.	2 gross.	3.00
Socket Framing Chisel, assorted.	2 gross.	5.00
File, assorted.	2 gross.	2.75
Auger, assorted.	2 gross.	2.75
Auger, large.	2 gross.	7.00
Patent Auger, Ives'.		dis 25
Patent Auger, Douglass'.	2 set.	\$1.25 net
Patent Auger, Swan's.	2 set.	\$1.25 net
<b>Hangers.</b>		
Barn Door, old pattern.		dis 60¢ to 10
Barn Door, New England.		dis 60¢ to 10
Climax (Anti-Friction).		dis 50
Challenge.		dis 10
Champion, Medina Mfg. Co.	2 sets.	dis 10 to 15
Sterling Improved (Anti-Friction).	2 sets.	dis 10 to 15
Cheritree.		dis 10
Kiddie's.		dis 50¢ to 1
U. S.	4 in.	\$1.25; 5 in.
The "Boss".	4 in.	\$1.25; 5 in.
Terry's Patent.	4 in.	\$1.25; 5 in.
	6 in.	dis 10 to 15
<b>Harness Soaps.</b>		
Anchor (T. & S. Mfg. Co.).		dis 60¢ to 10
Henahow's, list of 1/4 changed to \$1.00.		dis 60¢ to 10
Jud's, list of 1/4 changed to \$1.00.		dis 60¢ to 10
Fitch's (Bristol), list of 1/4 changed to \$1.00.		dis 60¢ to 10
Hotchkiss'.		dis 10
Andrews'.		dis 10
Sargent's.		dis 10 to 15
German.		dis 70¢ to 10
Covert.		dis 50¢ to 10
Covered Spring.		dis 60¢ to 10
<b>Hatchets.</b>		
Iron Blood.		dis 25
Shingling, Nos. 1 2 3.	2 dos.	\$7.25
Claw.	2 dos.	7.50
Lathing.	2 dos.	8.00
Hunt's.		dis 25
Shingling, Nos. 1 2 3.	2 dos.	\$7.25
Claw.	2 dos.	7.75
Lathing.	2 dos.	8.50
Hurd's.		dis 25
Shingling, Nos. 1 2 3.	2 dos.	\$7.25
Claw.	2 dos.	7.50
Lathing.	2 dos.	8.00
Yerkes & Plum.		dis 25
Shingling, Nos. 1 2 3.	2 dos.	\$7.50
Claw.	2 dos.	8.25
Lathing.	2 dos.	8.50
Simmons'.		dis 20
Shingling, Nos. 1 2 3.	2 dos.	\$7.50
Claw.	2 dos.	8.50
Lathing.	2 dos.	9.00
B. Br. ad.	2 dos.	9.00
Collins.		dis 10
Shingling, Nos. 1 2 3.	2 dos.	\$6.00
Claw.	2 dos.	6.50
Lathing.	2 dos.	7.00
Peck's Champion Blade.		dis 10
Shingling, Nos. 1 2 3.	2 dos.	\$8.00
Claw.	2 dos.	8.50
Lathing.	2 dos.	9.00
Half.	2 dos.	9.00
Half.	2 dos.	9.00
Pattern.	2 dos.	10.00
Half.	2 dos.	11.00
Half.	2 dos.	12.00
<b>Hay Knives.</b>		
W. W. Wadsworth's.		dis \$20.00 net
		dis 10%
<b>Hinges.</b>		
Gate, Western.	2 dos.	\$6.25
Gate, N. E.	2 dos.	\$10.12
Gate, N. E. Reversible.	2 dos.	\$8.00
Gate, Clark's Nos. 1, 2, 3.	2 dos.	\$8.00
Gate, N. Y. State.	2 dos.	\$8.00
Gate, Automatic.	2 dos.	\$12.50
Gate, Common Sense.	2 dos.	\$12.50
Gate, "Gymnasium".	2 dos.	\$12.50
Shaw's.	Nos. 10, 20 & 25.	dis 5 to 10
Old Blind Hinges.		dis 5 to 10
Old Plate Hinges.		dis 5 to 10
Tolled Raised.		dis 5 to 10
Hinges, 8, 10 & 12 in.	27.00	dis 100
Providence " over 12 in.	\$8.00	dis 100
crew Hook and Eye.	10, 12, 15 in.	\$7.50
Strap.	14 to 36 in.	\$6.50
Heavy Welded Hook.	8 to 12 in.	\$7.50
	14 in. & up.	\$6.00
crew Hook and Eye.	8 in.	dis 10
	10 in.	90
	12 in.	100
	14 in.	100
	16 in.	100
	18 in.	100
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Townsend's Patent	\$6.00	per doz.	dis 33%	
Jennings' "Star"	81	per doz	dis 33%	
The "Boss"	7	per doz	dis 10%	
W. Innes' -Wien Fish	1	per doz	dis 10%	
Cotton Chick.	1	per doz	dis 25%	
Silk. Lake Chalk.	Nos. 0, 1, 2, 3, 4	per doz	dis 55%	
W. C. Co.	5	per doz	dis 55%	
Mr. on's Linen	1	per doz	dis 25%	
W. Clothes. Galvanized	1	each	24c	
<b>Locks and Latches.</b>				
Cabinet, Eagle	1	Changes made in list price of		
Cabinet, Gaylord	1	some numbers Jan. 1, 1882		
Cabinet, Bridgeport	1	dis 26c & 5%		
Cabinet, P. & F. Corbin	1	dis 18c		
Cabinet, A. E. Deltz	1	dis 25c & 2%		
Trunk, new list, Jan. 1, 1882	1	dis 30c & 4%		
Locks, &c. - Crane's List, Jan. 1, 1882	1	dis 30c & 4%		
Round Key. Nos 1 to 6	1	dis 40c & 10%		
Round Key. Nos. 5 to 12	1	dis 40c & 10%		
Flat Key	1	dis 33c & 10%		
A. E. Deltz, Flat Key	1	dis 33c & 10%		
Yale's Lock Co., Flat Key	1	dis 33c & 10%		
"Shepardson" or "U. S."	1	dis 33c & 10%		
"Feltor" or "American"	1	dis 33c & 10%		
Plate	1	dis 35c & 10%		
F. Many's "Extension Cylinder"	1	dis 14c & 5%	dis net	
DOOR LOCKS, &c.				
Branford	1			
Norwalk	1			
Norwich	1			
F. F. Corbin	1			
Russell & Erwin	1			
Mallory, Wheeler & Co.	1			
Whipple Mfg. Co.	1			
Breed's Lock Co.	1			
Padlocks - Russell & Erwin	1			
Mallory, Wheeler & Co.	1			
Norwich Lock Mfg. Co.	1		dis 35c	
Wm. Wilcox & Co.	1		and 2% for cash	
Yale Lock Mfg. Co.'s "Standard"	1			
Romer's	1			
Conestoga	1		dis 30c	
The F. C. Miller, Flat Key	1		dis 33c & 10%	
Scandinavian Moore Bros.	1		dis 35c	
J. H. McWilliams	1		dis 35c	
A. E. Dietz	1		dis 35c	
"Star"	1		dis 35c	
<b>Lusters</b> - or bottles, 1/2 doz \$2.00; 1/2 gross \$18.00 net				
<b>Labels</b> - Hickey	1		dis 10c & 10%	
Lignumvitae	1		dis 10c & 10%	
Penfield Block Co., Lig., Apple & Hickory	1		dis 30c	
<b>Meat Cutters</b>				
Dixon's (F. S. & W.) Nos. 1	2	3	4	
" 2	\$14.00	17.00	19.00	30.00 - dis 30%
Miles' Challenge	Nos. 1	2	3	
" 2	\$22.00	30.00	40.00	dis 35%
Perry's, Nos. 1	2	3	4	5 F. G'd
" 2	\$3.00	4.00	6.00	11.00
Woodruff's (F. S. & W.), Nos. 10C	150	30.00	dis 30%	
" 10C	\$8.00	15.00	18.00	dis 30%
Halsey's, Nos. 11	12	13		
" 12	\$27.00	33.00	45.00	dis 50c & 10%
Draw Cut, Nos. 1	2	3	4	5
" 2	\$6.00	7.00	8.00	10.00
" 3	\$10.00	12.00	14.00	18.00
" 4	\$12.00	14.00	16.00	22.00
" 5	\$15.00	18.00	20.00	28.00
American	1	2	3	4
Nos. 1	2	3	4	B
" 2	\$6.00	7.00	8.00	10.00
" 3	\$10.00	12.00	14.00	18.00
Kiesler's No. 55	1	2	3	4
Kiser's Gem	1	2	3	4
Silver & Deming	1	2	3	4
Pennsylvania	1	2	3	4
Nos. 1	2	3	4	5
" 2	\$4.00	5.00	6.00	8.00
Beef Shavers (Enterprise Mfg. Co.)	1	2	3	4
" 2	\$12.00	15.00	18.00	25.00
<b>Mincing Knives</b>				
Am. & Co. (F. G'd), 1/2 gross, 1 blade, 7; 2 blades, \$12; 3 blades, \$18.				
Lothrop's				
" 2	\$12.00	15.00	18.00	25.00
Smith's, F. dos, Single, \$2.25; Double, \$3.00				
Cowles Edw. Co.				
<b>Meat Saws</b>				
" 2	\$12.00	15.00	18.00	25.00
<b>Meat Cutters</b>				
Stebbins Pattern				
Stebbins Genuine				
" 2	\$12.00	15.00	18.00	25.00
" 3	\$15.00	18.00	20.00	30.00
" 4	\$18.00	22.00	25.00	35.00
" 5	\$20.00	25.00	30.00	40.00
" 6	\$22.00	28.00	32.00	42.00
" 7	\$25.00	32.00	38.00	48.00
" 8	\$28.00	35.00	42.00	52.00
" 9	\$30.00	38.00	45.00	55.00
" 10	\$32.00	40.00	48.00	58.00
" 11	\$35.00	42.00	50.00	60.00
" 12	\$38.00	45.00	52.00	62.00
" 13	\$40.00	48.00	55.00	65.00
" 14	\$42.00	50.00	58.00	68.00
" 15	\$45.00	52.00	60.00	70.00
" 16	\$48.00	55.00	62.00	72.00
" 17	\$50.00	58.00	65.00	75.00
" 18	\$52.00	60.00	68.00	78.00
" 19	\$55.00	62.00	70.00	80.00
" 20	\$58.00	65.00	72.00	82.00
" 21	\$60.00	68.00	75.00	85.00
" 22	\$62.00	70.00	78.00	88.00
" 23	\$65.00	72.00	80.00	90.00
" 24	\$68.00	75.00	82.00	92.00
" 25	\$70.00	78.00	85.00	95.00
" 26	\$72.00	80.00	88.00	100.00
" 27	\$75.00	82.00	90.00	102.00
" 28	\$78.00	85.00	92.00	105.00
" 29	\$80.00	88.00	95.00	108.00
" 30	\$82.00	90.00	98.00	110.00
" 31	\$85.00	92.00	100.00	112.00
" 32	\$88.00	95.00	102.00	115.00
" 33	\$90.00	98.00	105.00	118.00
" 34	\$92.00	100.00	108.00	120.00
" 35	\$95.00	102.00	110.00	122.00
" 36	\$98.00	105.00	112.00	125.00
" 37	\$100.00	108.00	115.00	128.00
" 38	\$102.00	110.00	118.00	130.00
" 39	\$105.00	112.00	120.00	132.00
" 40	\$108.00	115.00	122.00	135.00
" 41	\$110.00	118.00	125.00	138.00
" 42	\$112.00	120.00	128.00	140.00
" 43	\$115.00	122.00	130.00	142.00
" 44	\$118.00	125.00	132.00	145.00
" 45	\$120.00	128.00	135.00	148.00
" 46	\$122.00	130.00	138.00	150.00
" 47	\$125.00	132.00	140.00	152.00
" 48	\$128.00	135.00	142.00	155.00
" 49	\$130.00	138.00	145.00	158.00
" 50	\$132.00	140.00	148.00	160.00
" 51	\$135.00	142.00	150.00	162.00
" 52	\$138.00	145.00	152.00	165.00
" 53	\$140.00	148.00	155.00	168.00
" 54	\$142.00	150.00	158.00	170.00
" 55	\$145.00	152.00	160.00	172.00
" 56	\$148.00	155.00	162.00	175.00
" 57	\$150.00	158.00	165.00	178.00
" 58	\$152.00	160.00	168.00	180.00
" 59	\$155.00	162.00	170.00	182.00
" 60	\$158.00	165.00	172.00	185.00
" 61	\$160.00	168.00	175.00	188.00
" 62	\$162.00	170.00	178.00	190.00
" 63	\$165.00	172.00	180.00	192.00
" 64	\$168.00	175.00	182.00	195.00
" 65	\$170.00	178.00	185.00	198.00
" 66	\$172.00	180.00	188.00	200.00
" 67	\$175.00	182.00	190.00	202.00
" 68	\$178.00	185.00	192.00	205.00
" 69	\$180.00	188.00	195.00	208.00
" 70	\$182.00	190.00	198.00	210.00
" 71	\$185.00	192.00	200.00	212.00
" 72	\$188.00	195.00	202.00	215.00
" 73	\$190.00	198.00	205.00	218.00
" 74	\$192.00	200.00	208.00	220.00
" 75	\$195.00	202.00	210.00	222.00
" 76	\$198.00	205.00	212.00	225.00
" 77	\$200.00	208.00	215.00	228.00
" 78	\$202.00	210.00	218.00	230.00
" 79	\$205.00	212.00	220.00	232.00
" 80	\$208.00	215.00	222.00	235.00
" 81	\$210.00	218.00	225.00	238.00
" 82	\$212.00	220.00	228.00	240.00
" 83	\$215.00	222.00	230.00	242.00
" 84	\$218.00	225.00	232.00	245.00
" 85	\$220.00	228.00	235.00	248.00
" 86	\$222.00	230.00	238.00	250.00
" 87	\$225.00	232.00	240.00	252.00
" 88	\$228.00	235.00	242.00	255.00
" 89	\$230.00	238.00	245.00	258.00
" 90	\$232.00	240.00	248.00	260.00
" 91	\$235.00	242.00	250.00	262.00
" 92	\$238.00	245.00	252.00	265.00
" 93	\$240.00	248.00	255.00	268.00
" 94	\$242.00	250.00	258.00	270.00
" 95	\$245.00	252.00	260.00	272.00
" 96	\$248.00	255.00	262.00	275.00
" 97	\$250.00	258.00	265.00	278.00
" 98	\$252.00	260.00	268.00	280.00
" 99	\$255.00	262.00	270.00	282.00
" 100	\$258.00	265.00	272.00	285.00
" 101	\$260.00	268.00	275.00	288.00
" 102	\$262.00	270.00	278.00	290.00
" 103	\$265.00	272.00	280.00	292.00
" 104	\$268.00	275.00	282.00	295.00
" 105	\$270.00	278.00	285.00	298.00
" 106	\$272.00	280.00	288.00	300.00
" 107	\$275.00	282.00	290.00	302.00
" 108	\$278.00	285.00	292.00	305.00
" 109	\$280.00	288.00	295.00	308.00
" 110	\$282.00	290.00	298.00	310.00
" 111	\$285.00	292.00	300.00	312.00
" 112	\$288.00	295.00	302.00	315.00
" 113	\$290.00	298.00	305.00	318.00
" 114	\$292.00	300.00	308.00	320.00
" 115	\$295.00	302.00	310.00	322.00
" 116	\$298.00	305.00	312.00	325.00
" 117	\$300.00	308.00	315.00	328.00
" 118	\$302.00	310.00	318.00	330.00
" 119	\$305.00	312.00	320.00	332.00
" 120	\$308.00	315.00	322.00	335.00
" 121	\$310.00	318.00	325.00	338.00
" 122	\$312.00	320.00	328.00	340.00
" 123	\$315.00	322.00	330.00	342.00
" 124	\$318.00	325.00	332.00	345.00
" 125	\$320.00	328.00	335.00	348.00
" 126	\$322.00	330.00	338.00	350.00
" 127	\$325.00	332.00	340.00	352.00
" 128	\$328.00	335.00	342.00	355.00
" 129	\$330.00	338.00	345.00	358.00
" 130	\$332.00	340.00	348.00	360.00
" 131	\$335.00	342.00	350.00	362.00
" 132	\$338.00	345.00	352.00	365.00
" 133	\$340.00	348.00	355.00	368.00
" 134	\$342.00	350.00	358.00	370.00
" 135	\$345.00	352.00	360.00	372.00
" 136	\$348.00	355.00	362.00	375.00
" 137	\$350.00	358.00	365.00	378.00
" 138	\$352.00	360.00	368.00	380.00
" 139	\$355.00	362.00	370.00	382.00
" 140	\$358.00	365.00	372.00	385.00
" 141	\$360.00	368.00	375.00	388.00
" 142	\$362.00	370.00	378.00	390.00
" 143	\$365.00	372.00	380.00	392.00
" 144	\$368.00	375.00	382.00	395.00
" 145	\$370.00	378.00	385.00	398.00
" 146	\$372.00	380.00	388.00	400.00
" 147	\$375.00	382.00	390.00	402.00
" 14				

Razor Straps.	dis 60 10 5
Genius Ent.	dis 60 10 5
Badger's (not Emerson).	dis 33 5
Emerson.	dis 33 5
Imitation Emerson.	dis 30 10 5
Hunt's.	dis 15 20 5
"Imitation."	dis 15 20 5
Haunser's.	dis 10 5
Torrey's.	dis 10 5
Rivets.	dis 20 5
Iron and Tinmed, new list, Dec. 10, 1881.	dis 10 40 5
In bulk, new list, July 10, 1881.	dis 45 10 5
Copper Rivets and Burns.	dis 45 10 5
Nos. 7 8 9 10 11 12 13 14 15	dis 45 10 5
W. B. 400 600 800 1000 1200 1500	dis 70 10 5
Rivet Sets.	dis 20 5
Boles.	dis 20 5
Steel Bass.	dis 40 5
Stair, Black Walnut.	dis 40 5
Stair, American Patent.	dis 20 5
Rollers.	dis 60 10 5
Barn Door, Sargent's list.	dis 60 10 5
Acme (Anti-Friction).	dis 60 10 5
Hope.	dis 10 5
Manila, 1/4 t. July 6 and 17, 1881.	dis 10 5
Manila.	1/4 inch and larger dis 10 5
Manila.	3/4 inch dis 10 5
Manila.	3/4 and 1 1/2 inch dis 10 5
Manila, Taffy.	dis 10 5
Manila, Taffy Lathe Yarn.	dis 10 5
Manila, Hay Rope.	dis 10 5
Manila, Hay Rope.	1/4 inch and larger dis 10 5
Manila.	1/4 and 1 1/2 inch dis 10 5
Manila.	1/4 and 1 1/2 inch dis 10 5
Manila, Hay Rope.	dis 10 5
Rules.	Boxwood. Ivory.
Chapin's.	dis 60 10 5
Standard.	dis 60 10 5
Stephens.	dis 60 10 5
Sand Irons.	From 4 to 10 lb.
Self-Heating.	dis 30 10 5
Self-Heating, Tailors.	dis 30 10 5
Gleeson's Shield and Fender.	dis 20 5
Mrs. Pott's Irons, Doubled Pointed.	dis 55
Mrs. Pott's Iron Square Back.	dis 35 5
Enterprise Star Irons, new list, July 20, 1882.	dis 15 5
Common Fitter and Sad Iron.	dis 35 5
Baader & Adamson's Flint.	dis 15 5
Baader & Adamson's Flint, 2 1/2 & 3 1/2 lb. ream.	dis 10 5
Baader & Adamson's Flint, Assorted.	dis 10 5
Baader & Adamson's Flint.	dis 10 5
Baader & Adamson's Emery.	dis 10 5
Ruby.	dis 10 5
Blazing Sun.	dis 10 5
Dixon's Blazing Sun.	dis 10 5
Sash Cord.	Common.
Common.	dis 10 5
Patent.	dis 10 5
Silver Lake, Hem.	dis 10 5
Silver Lake, Haze Cotton.	dis 10 5
Silver Lake, Drab Cotton.	dis 10 5
Raw Hide.	dis 10 5
Steel Ribbon.	dis 10 5
Mail Locks.	Clark's No. 1, \$1.00; No. 2, \$1.00 per gross.
Common.	dis 10 5
Porter.	dis 10 5
Straw Cut No. 4.	each \$1.00, dis 20 5
Enterprise Mfg. Co.	dis 10 5
Silvers.	dis 10 5
Saw.	Diaston's Circular.
Common.	dis 10 5
Diaston's Mill.	dis 10 5
Diaston's Cross Cut.	dis 10 5
Diaston's Panel, Rip, &c.	dis 10 5
Boynton's Lighting Buck Saws.	dis 10 5
Boynton's Bullet Webs, 30 inch, new list.	dis 10 5
Boynton's Lightning Buck Saws X Bar.	dis 10 5
Boynton's Lightning Buck, Panel and Rip.	dis 10 5
W. M. & C. Mfg. Co. Cross Cut.	dis 10 5
W. M. & C. Mfg. Co. Cross Cut.	dis 10 5
Livington's Butcher and Kitchen.	dis 10 5
Livington's Framed Wood—	100 100 100 100 100 100
Padlock.	\$10.00 8.00 10.00 7.00 6.00 5.00
Peace Circular and Mill.	dis 10 5
Peace Hand, Pam and Rip.	dis 10 5
Peace Cross.	dis 10 5
Peace Hand Saws, all widths.	dis 10 5
Saw Frames.	White, Vermont.
Red, Polished and Varnished.	dis 10 5
Saw Rods.	dis 10 5
Saw.	Boyton's Patent X Cut, per doz. \$12.00; Hand Saw per doz. \$1.00.
Stilman's Genuine.	dis 10 5
Stilman's Patent.	dis 10 5
Common Lever.	dis 10 5
Leach's.	No. 1, \$1.00; No. 1, \$1.00; dis 10 5
Nash's.	dis 10 5
Hammer, Hether.	dis 10 5
Bemis & Call Co.'s New Patent Hammer.	dis 10 5
Bemis & Call Co.'s Plate.	dis 10 5
Bemis & Call Co.'s Cross Cut.	dis 10 5
Aiken's Genuine.	dis 10 5
Aiken's Imitation.	dis 10 5
Hart's Patent Lever.	dis 10 5
Diaston's.	No. 1, \$1.00; No. 1, \$1.00; dis 10 5
Sea Legs.	Hatch Counter, No. 171.
Hatch, Tea, No. 16.	dis 8.00, dis 32 1/2 & 100
Union Platform.	dis 8.00, dis 100
Fairbank.	dis 10 5
Bath & Scale Co.	dis 10 5
Forsyth Scale Co.	dis 10 5
Howe's.	dis 10 5
Chatillon's Genuine.	dis 10 5
Family Universal.	dis 10 5
Family.	dis 10 5
Family.	dis 10 5
Turbo.	dis 10 5
Scale Beam, List of January 12, 1882.	dis 10 5
Scissors.	Adjustable Box Scissors (S. R. & L. Co.).
Box, 1 Hand.	dis 20 5
Box, 2 Hand.	dis 20 5
Defiance Box and Shear.	dis 20 5
Foot.	dis 40 5
Ship, common.	dis 20 5
Ship, common.	dis 20 5
Ship, Providence Tool Co.	dis 10 5
Screen Corners.	Porter's Pat. Window and Door Frame.
Screw Drivers.	dis 33 5
Douglas Mfg. Co.	dis 20 5
Diaston's Patent Excisor.	dis 20 5
Buck Bro.	dis 20 5
Stanley Rule & Level Co.'s, Varnished Hds.	dis 10 5
Stanley Rule & Level Co.'s, Black Handles.	dis 10 5
Baader & Adamson's.	dis 10 5
Gay's Double Action Ratchet.	dis 10 5
Ydos. 4 in. \$1.00; 5 in. \$1.20; 6 in. \$1.30; 10 5	
Mallet & Co.'s Double Action Ratchet.	dis 10 5
Ydos. 4 in. \$1.00; 5 in. \$1.20; 6 in. \$1.30; 10 5	
Champion.	Ydos. 4 in. \$1.00; 5 in. \$1.20; 6 in. \$1.30; 10 5
Cowles Hdw. Co., No. 1 Extra.	dis 10 5
Cowles Hdw. Co., No. 1.	dis 10 5
Cowles Hdw. Co., No. 4 and 6.	dis 10 5
Clark's Patent.	dis 10 5
Screws.	Porter's Pat. Window and Door Frame.
Porter's Pat. Window and Door Frame.	dis 33 5
Round Head Iron.	New list April 27, 1881.
Flat Head Brass.	New list April 27, 1881.
Flat Head Brass.	New list April 27, 1881.
Brown Head Brass.	Cor. Steel Co.
Japanned Head of Plain Screws.	dis 10 5
Coach, Patent Gimlet Point.	dis 10 5
Coach, Common or Lag.	dis 10 5
Bed.	dis 10 5
Machine Head Iron.	dis 10 5
Machine Round Head Iron.	dis 10 5
Bench, Iron, 10 lbs.	dis 10 5
Bench, Iron, 10 lbs.	dis 10 5
Bench, Wood, Hickory.	dis 10 5
Hand, Wood.	dis 10 5
Hand Ball, Sargent's.	dis 10 5
Hand Ball, Sargent's.	dis 10 5
Hand Ball, Sargent's.	dis 10 5
Hand Ball, Am. Screw Co., List of Jan. 1.	dis 10 5
Jack (Wilson's).	dis 10 5
Screw Windows.	Porter's Pat. Window and Door Frame.
R. B. Huglin's, No. 1, \$2.10; No. 2, \$1.75; No. 3, \$1.50.	dis 10 5
Screw Saws.	Lester, \$10.00.
Rogers, \$3.00.	dis 25 5
Shears and Scissors.	American (Cast) Iron.
Barnard's Lamp Trimmers.	dis \$0.75
Timmers'.	dis 10 5
Seymour's, May 1, 1881.	dis 10 5
Hirsch's List, 1881.	dis 33 5
Hirsch's Tailor's Shears.	dis 10 5
Mass. Cutlery Co. St. Trimmers.	dis 75 5
Shears.	Sliding Door, M. W. & Co. list.
Sliding Door.	dis 10 5
Sliding Door, Patent Roller.	dis 10 5
Sliding Door, Patent Roller, Hatfield's.	dis 10 5
Sliding Door, Russell's Anti-Friction.	dis 10 5
Sliding Door, Russell's Anti-Friction.	dis 10 5
Sliding Door, Moore's Anti-Friction.	dis 10 5
Sliding Shutter, Sargent's list.	dis 10 5
Sliding Shutter, Reading list.	dis 10 5
Moore's Anti-Friction (Ring Ring).	dis 45
Shears and Spades.	Johns' List, July 10, 1881.
Griffiths.	dis 10 5
Old Colony.	dis 10 5
Payne Petetbone & Son, new list.	dis 10 5
Payne Petetbone & Son, new list.	dis 10 5
Payne Petetbone & Son, new list.	dis 10 5
McDonald's (Lowman's Patent).	dis 10 5

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Of Steel and Iron, up to 30 inches wide, and of any desired thickness and length.

Address, PITTSBURGH, PA.

## THE CLEVELAND CRUCIBLE STEEL CO.

## PITTSBURGH BESSEMER STEEL CO. (LIMITED).

## STEEL RAILS

LIGHT RAILS A SPECIALTY.

P. O. Address, 87 Wood Street, Pittsburgh, Pa.

## THOS. FIRTH & SONS, Limited,

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## Crucible Cast Steel.

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AGENTS AND IMPORTERS OF

## SWEDISH IRON,

35 Oliver St., BOSTON. 23 Cliff St., NEW YORK.

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## LINDEN STEEL COMPANY, Limited,

MANUFACTURERS OF

## OPEN-HEARTH STEEL,

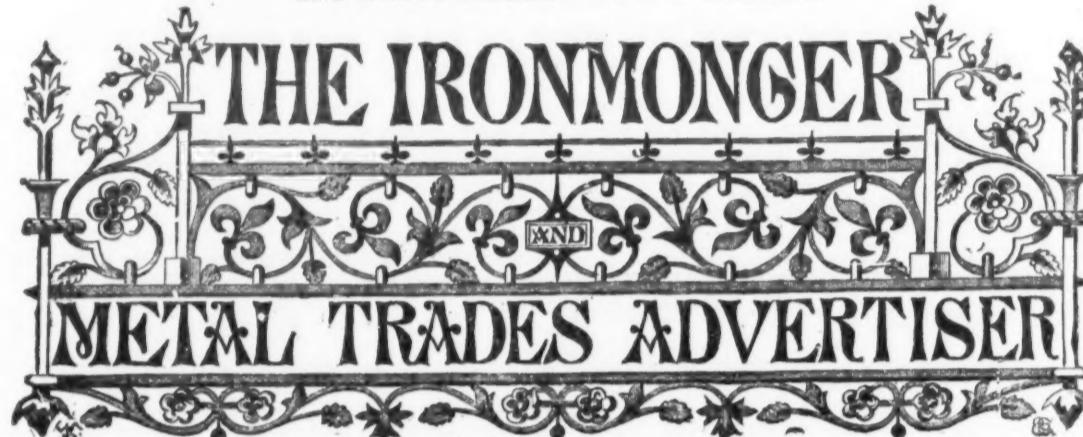
Off, No. 173 Wood St., PITTSBURGH, PA.

Ingots, Blooms, Billets, Slabs, Spring, Tire, Rod, Agricultural and Other Steels.

Correspondence in reference to special shapes, sizes and qualities respectfully solicited.



ESTABLISHED IN 1859.



PUBLISHED EVERY SATURDAY.

THE OLDEST AND CHIEF REPRESENTATIVE OF THE IRON, HARDWARE AND METAL TRADES.

OFFICE: 44a CANNON STREET, LONDON, E. C.

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PITTSBURGH OFFICE: 77 Fourth Avenue—JOS. D. WEEKS, Manager and Associate Editor. CINCINNATI OFFICE: Builders' Exchange—T. T. MOORE, Manager. PHILADELPHIA OFFICE: 220 South Fourth Street—THOMAS HOBSON, Manager. SOUTHERN OFFICE: Cor. Eighth and Market Streets, Chattanooga, Tenn.—S. B. LOWE, Manager.

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Notes of Novelties.—This is a department of the journal always watched with interest by the trade, as it contains an account, from week to week, of the novelties which manufacturers and inventors are introducing to the notice of the trade. These articles are freely illustrated.

Special Correspondents.—The ironmonger has a deserved reputation for its special correspondence from all the principal Continental, British and manufacturing centers. The writers are gentlemen holding important positions in the districts with which they are connected, and possess facilities for acquiring information specially suited for the columns of the *Ironmonger*. *The Week*, *Legal News*, *Trade Notes*, *Bankruptcies*, *Foreign Notes*, *Colonial Jottings*, *Merchants' Circulars*, &c., are each departments of the journal containing a digest of all matters of direct interest to the Iron, Hardware and Metal Trades. In addition to the above, there is a carefully classified list of Patents, together with Editorial Notes French Belgian and other Special Correspondence.

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This is an annual, presented free to every subscriber to the *Ironmonger* and *Metal Trades' Advertiser*. It contains a large number of ruled skeleton pages for diary and other entries, and in addition much useful reference information, varied from year to year. It is handsomely bound in cloth, gilt; and as copies are used in thousands of establishments for a whole year, it is obviously a medium of exceptional value for advertisements. Sold to non-subscribers at 75 cents.

### THE FOREIGN SUPPLEMENT,

With which is incorporated *The Universal Engineer*,Is published every fourth week in connection with the extensive and world-wide circulation of the *Ironmonger* itself. The dates of its publication for the next twelve months will be as follows: AUGUST 1, SEPTEMBER 5 and 30, OCTOBER 25, NOVEMBER 25, DECEMBER 25, 1882, JANUARY 20, FEBRUARY 17, MARCH 15, APRIL 7, MAY 5, JUNE 2 and 30, and JULY 25, 1883.

This Supplement is published in

### FOUR LEADING COMMERCIAL LANGUAGES

of the world, including English, and is sent to all the countries where they are spoken, thus placing the contents of the *Ironmonger* not only within reach but in the native language of eighty millions of German, forty-two millions of French, twenty-eight millions of Italian, and fifty-one millions of Spanish speaking people; or, in all, over two hundred millions of inhabitants in the principal nations where the best purchasers of manufactured goods are to be found.

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### THE WHOLE FOREIGN HARDWARE TRADE

so far as our experience of twenty years is concerned, will be covered by *The Foreign Supplement* at least twice a year. Thus a Price List or Advertisement inserted in the *Ironmonger* and *Foreign Supplement* is a strikingly powerful and most efficient way of publicity not to be compared with any of the other ordinary channels of communication.

# HENRY DISSTON & SONS,

## KEYSTONE SAW, TOOL, STEEL & FILE WORKS,

Front and Laurel Streets, PHILADELPHIA.

### DISSTON'S SAMSON TREE PLANTER AND POST HOLE DIGGER.

Fig. 1.



Patented May 29, 1870.

Price, \$37.50 per dozen.

No Farmer, Nurseryman, Railroad  
or Telegraph Company  
SHOULD BE WITHOUT ONE.

NO BACK-ACHE.  
NO KNEE-WORK.  
NO CLOGGING.

This tool has been thoroughly tested, and has given the greatest satisfaction to all who have tried it. The principle on which it works makes it self-cleaning and prevents adhesion in sticky soil; therefore it always works free and easy. It is far superior to all plungers, augers and boring machines, as it works well in stony, sandy, or clay soils; quicksand under water is as easily removed as though no water existed.

## DIRECTIONS.

Plunge the Digger into the ground, as shown in cut, Fig. 1, and when the soil is loosened pull out the lever with one hand, as shown in cut, Fig. 2, which will press the dirt between the blades; then draw the Digger from the hole, keeping hold of the lever with one hand and the handle with the other. When the Digger is clear of the hole, you can deposit the load anywhere within reach by simply pressing down the lever, which will open the blades and the dirt will fall from between them. The Digger is then ready for another plunge. The steel blades are nine inches long, and the whole tool five feet long. For sale at Hardware and Agricultural Stores.

HENRY DISSTON &amp; SONS.

# BROWER & LEEDS,

HARDWARE MANUFACTURERS' AGENTS,

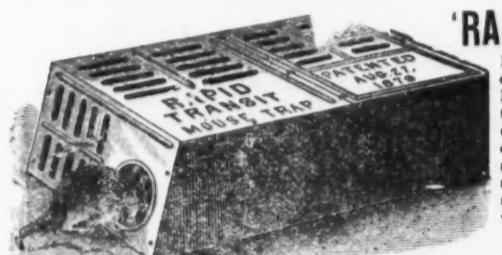
81 Murray Street, NEW YORK.

SOLE AGENTS FOR

### BROOKS' "BOSS" SCYTHE RIFLES AND "BOSS" KNIFE SHARPENERS.

MADE OF PURE TURKISH EMERY.

Warranted not to Scale or Glaze. They are impervious to Water and not affected by Solar Heat.



Patented August 27, 1878.

MANUFACTURED BY

THE SMITH & EGGE MANUFACTURING CO., Bridgeport, Conn.  
Agents, FLAGER, FORSYTH & BRADLEY 298 Broadway, New York.



WASHERS.

Cuyahoga Falls,  
Ohio.  
Tinned  
Belt Rivets  
AND  
Burrs a Specialty.  
EASTERN AGENTS,  
Alford, Ward, Davenport & Co.,  
85 Chambers St., New York.

MORSE TWIST DRILL AND MACHINE CO.

NEW BEDFORD, MASS., Sole Manufacturers of

Morse Patent Straight-Lip Increase Twist Drill,  
Beach's Patent Self-Centering Chuck, Solid and Shell Reamers,  
BIT STOCK DRILLS,

DRILLS FOR COES, WORCESTER, HUNTER AND OTHER HAND DRILL  
PRESSSES. BEACH'S PATENT SELF-CENTERING CHUCKS, CENTER  
AND ADJUSTABLE DRILL CHUCKS, SOLID AND SHELL REAMERS.  
DRILL GRINDING MACHINES. TAPER REAMERS, MILLING  
CUTTERS AND SPECIAL TOOLS TO ORDER.

All Tools exact to Whitworth Standard Gauges.

GEO. R. STETSON, Supt.

EDWARD S. TABER, Treas.



WITHEROW & GORDON,  
Engineers & Contractors  
PITTSBURGH, PA.

Agents for the

### WHITWELL HOT BLAST STOVES.

OVER 600 IN USE.

The following parties either have been in

Cedar Point Iron Co., N. Y.  
Dunbar Furnace Co., Pa.  
Crane Iron Co., Pa.  
Pennsylvania Steel Co., Pa.  
Niles Furnace Co., Pa.  
R. H. Coleman, Lebanon, Pa.  
Chester Rolling Mill Co., Pa.  
Davenport, Fairbank & Co., Pa.  
Fisher Rolling Mill Co., Pa.  
Paxton Furnaces, Pa.  
Spearman Iron Co., Pa.  
Elina Iron Works, Ohio.  
Miles Carbon and Iron Co., Ohio.  
Winona Furnace Co., Ohio.  
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Rocking Valley Iron Co., Ohio.  
Chester Rolling Mill Co., Ohio.  
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North Chicago Steel Co., Ill.  
Union Iron and Steel Co., Ill.  
Miles Carbon and Iron Co., Ill.  
Ashland Furnace Co., Ky.  
Norton Iron Co., Ky.  
Southern States Co., I. and S. Co., Tenn.  
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I PLATT ST., NEW YORK.

Proprietor of the ATLANTIC SCREW WORKS,

Agent for the Florence Tack Co.,

AND SOLE AGENT FOR

C. A. Maynard's Trowels.

A full stock of all Patterns. London, N. Y.  
Philadelphia, Boston, Lowell and Pointing on hand.  
Every Trowel warranted.

RODS. Spring  
quality, of Bessemer  
and other  
Steel. Superior  
value. F. O. B.  
Liverpool.

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ADDRESS:  
A. C. LESLIE & CO., Montreal.



Prouty's Patent  
PEERLESS FORCE  
PUMP.

Has Self-Adjustable Foot Rest.

NEW AUTOMATIC COMPENSATING  
PACKING.

It will throw a continuous jet from  
FORTY TO SIXTY FEET. A new pattern  
jet and spray nozzle is sent with  
each pump.

Especial attention is called to the  
material and workmanship exhibited  
in these pumps.

LIST PRICE, \$8.

THE NEW ENGLAND BUTT CO  
PROVIDENCE, R. I.

J. STEVENS &amp; CO.,

Chicopee Falls, Mass., P. O. Box 224,

Manufacturers of

### SPRING CALIPERS AND DIVIDERS

Also, Surface Gauges and Counter Sinks, Stevens' Patent  
Breech-Loading Sporting Rifles, double and single barrel; Shot  
Guns, Pocket Rifles, Pocket Pistols, and the noted Hunters' Pet  
Rifles. Our

SHOOTING GALLERY RIFLE

Is the favorite everywhere.

## PERFORATED SHEET METALS,

FOR ALL USES.



Light or heavy work in Iron, Steel,  
Brass or Tin.  
Perforated Zinc and Sheet Iron, for  
Malt Kiln Floors, Grain Dryers, Fluit  
Mill Jackets, Threshers, Separators, Corn  
Shells, and all kinds of Grain Cleaning  
Machinery; also for Mincing and  
Crushing Works, Coal, Coke and Ore  
Screens, Gas and Water Works, Paper,  
Woolen and Flour Mills, Filters, Strain-  
ers, Vessels, etc. TIN and BRASS of all sizes, from Sheet  
Copper, Brass and Zinc Punched to any  
size required. Special Attention  
Given to Work for Tailors, Tailors  
and Car-Builders. Special discounts to  
the trade. Correspondence solicited.

Harrington & Oglesby Co.,  
Nos. 43, 45 & 47 South Jefferson St.,  
CHICAGO, ILL.

## SANDS' TRIPLE MOTION WHITE MOUNTAIN ICE CREAM FREEZERS.

THE WHITE MOUNTAIN FREEZER COMPANY are headquarters for Ice Cream Freezers and Ice  
Makers, being the only firm in the United States who manufacture all parts of the raw material.  
The examining Committee, consisting of 50,000  
men of the United States have recom-  
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in the world for the following reasons:

We have used them; they freeze  
quicker than any other; they save time,  
salt and ice; the triple motion makes  
smooth cream without bunches; makes  
more of it; galvanized iron outside; tin  
inside; no zinc in contact with the  
cream; easily adjusted; substantial-  
ly made; simple to construct; per-  
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and discount of this celebrated Freezer.  
Address,

White Mountain Freezer Co.,  
Nashua, N. H., U. S. A.

SPECIAL ATTENTION GIVEN TO EXPORT ORDERS.

BEECHER & PECK,  
Successors to Milo Peck, Manufacturers of



PECK'S DROP LIFTER is the only one which has its parts  
cushioned. Being thus cushioned they are the most durable Lifter in  
the market.

Can be attached to any drop now in use.

Send for Illustrated Catalogue.

Cor. Lloyd and River Sts., New Haven, Conn.

PURE TURKISH EMERY,  
EXCELSIOR POLISH, METAL QUARTZ, PUMICE, ROTTEN STONE, CROCUS, ROUGE,  
GLUE SAND PAPER, EMERY PAPER, AND CLOTH, AND C. & C. & C.  
WALPOLE EMERY MILLS, MILLS. SO. WALPOLE 114 MILK ST. BOSTON, MASS.

### THE MOUNT CARMEL" OX SHOE.

Steel Toe Calk.  
FINISHED READY FOR NAILING ON.  
WARRANTED

The Best and Cheapest Shoe Made.

IVES, WOODRUFF &amp; CO.

Manufacturers,

MOUNT CARMEL, CONN.

For sale by dealers in blacksmiths' supplies.

NOVELTY IRON FOUNDRY.  
HAIGHT & CLARK, 16 & 18 De Witt St., Albany, N. Y.

Manufacturers of

FINE GRAY IRON CASTINGS OF EVERY DESCRIPTION.  
Rosettes and Pickets for Wire Workers, Castings for Furniture and Piano  
Manufacturers. Iron and Metal Patterns of all kinds a specialty.  
Correspondence solicited for JAPANNING, COPPERING, BRONZING.



## PATENT RUBBER BUCKETS AND CHAIN FOR CHAIN PUMPS.



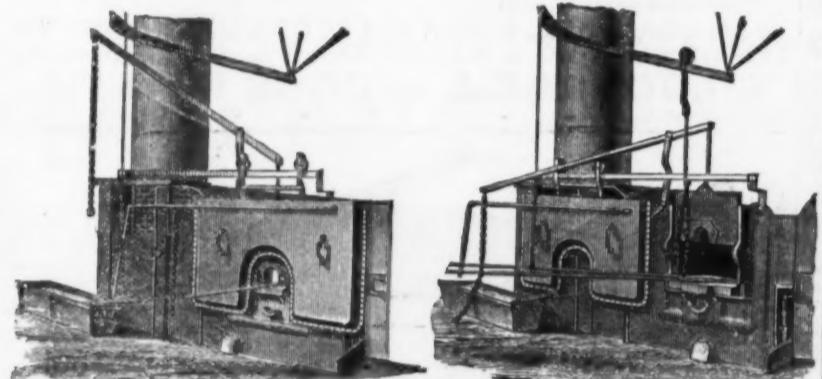
The only Perfect Expanding, Self-Draining Valve Bucket made. Our Patents cover the use of the Rubber, Nut and Bolt for Expanding, Tube and Valve for Draining. Order only the Rumsey Bucket, and avoid infringing.

SEND FOR SAMPLE.

L. M. RUMSEY MFG. CO., ST. LOUIS, MO.

AMERICAN BOLT CO., Lowell, Mass.,  
MANUFACTURERS OF  
Bolts, Nuts, Washers, Chain Links, Car  
Bolts, Bridge Bolts, Lag Screws, &c.

## McDONALD'S PATENT SHIELD.



For Protecting the Men from Heat when Working in Front of  
Puddling, Heating and other Furnaces.

H. McDONALD, Patentee,  
MANAGER SLIGO ROLLING MILLS,

PITTSBURGH, PA.  
ELBA IRON & BOLT CO., Limited.

MANUFACTURERS OF  
MERCHANT BAR IRON,  
Skelp Iron, Splice Bars, Railway Track Bolts, Car, Bridge,  
and Machinery Bolts, Nuts, &c.

We invite the attention of RAILROAD MEN especially to our make of SPLICE BARS and Track Joints. Using the best brands of REFINED IRON, and paying close attention to the finish of our manufactures, we are enabled to offer our patrons BOLTS, NUTS, SPLICE BARS, &c., of excellent quality. Our works have been enlarged within a few years; all orders are now executed with promptness; all our work guaranteed.

SEND FOR PRICE LISTS AND INFORMATION TO  
ELBA IRON & BOLT CO. Limited, Pittsburgh, Pa.  
LOVEJOY & DRAKE, 49 Cortlandt Street, New York, Agents.

PHILADELPHIA SMELTING COMPANY, Limited.  
S. E. Cor. Twelfth and Noble Sts., PHILADELPHIA.

GENUINE BABBITT. Guaranteed at a speed of 10,000 a minute, and at any pressure for 10 years.

Office JAMES BUTTERWORTH & SON, Manufacturers of Woolen Machinery, 262, 264 and 266 E. Adams St., PHILADELPHIA, October 17, 1882.

PHILADELPHIA SMELTING COMPANY.—GENTLEMEN: We have been running your "Genuine Babbitt" on our wood drilling machine for the last eight years at a speed of 9000 revolutions per minute, with out renewal. We have found it to be the best metal we ever used.

Yours truly, JAMES BUTTERWORTH & SON.

DEOXIDIZED BRONZE,

Superior to Phosphor Bronze or any other alloy of Copper and Tin for Machinery Journals.

PHILADELPHIA, October 4, 1879.  
"Deoxidized Bronze" as journal boxes in our rolling mill, where great pressure is required, we take pleasure in recommending it as being superior to any we have heretofore used.

Very truly, HENRY DISSTON & SONS.

PHILADELPHIA SMELTING COMPANY, CITY.—GENTLEMEN: After a trial of eighteen months of your "Deoxidized Bronze" as journal boxes in our rolling mill, where great pressure is required, we take pleasure in recommending it as being superior to any we have heretofore used.

Very truly, HENRY DISSTON & SONS.

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Very truly, HENRY DISSTON & SONS.

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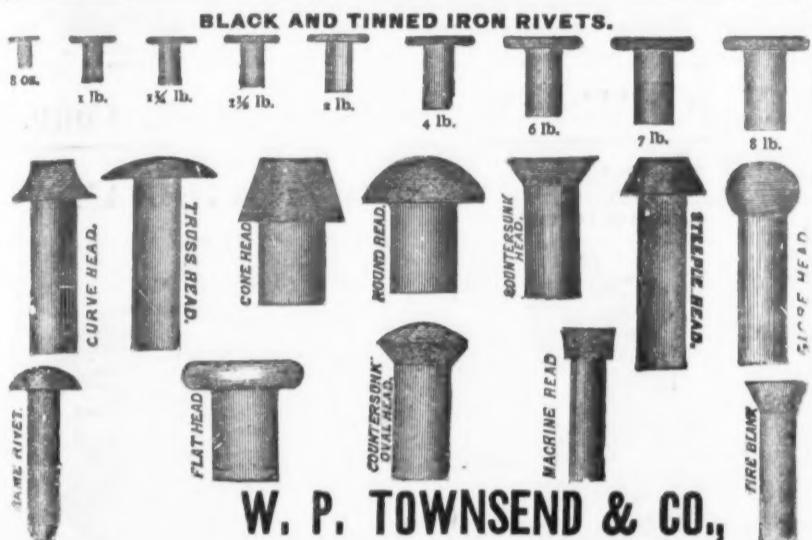
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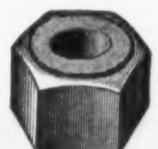
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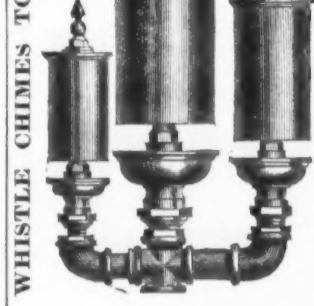
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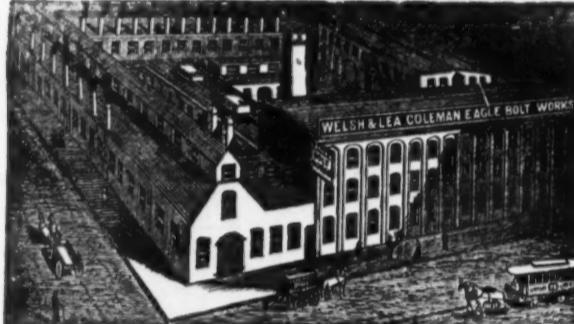
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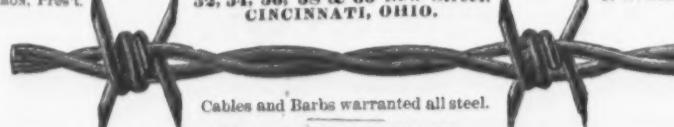
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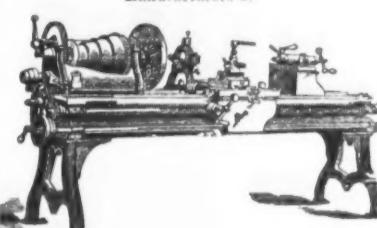
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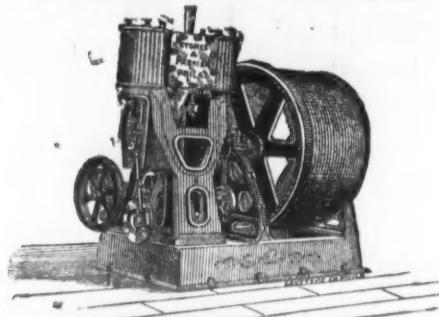
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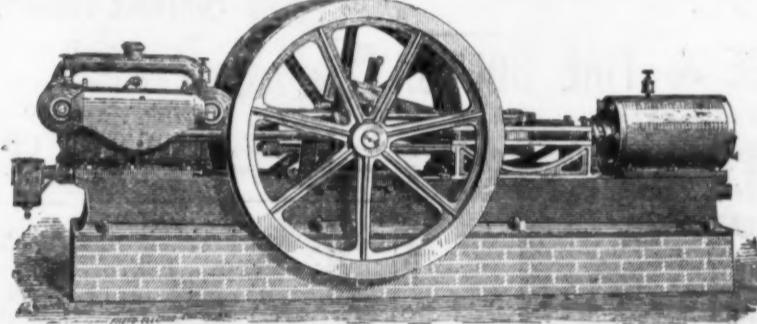
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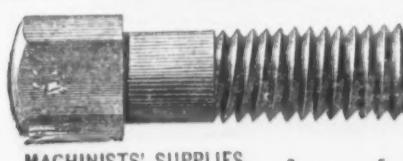


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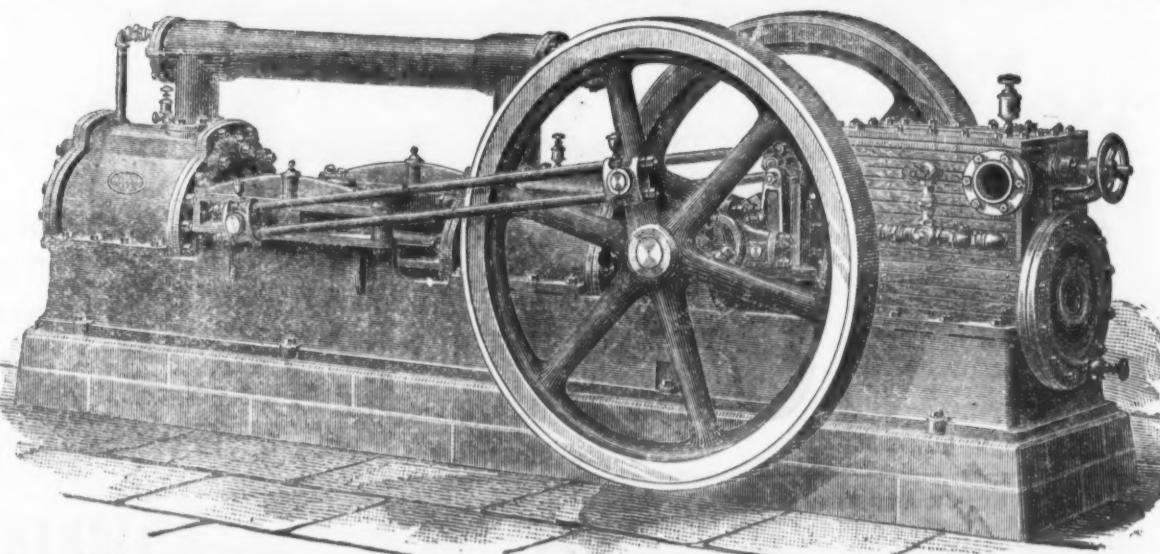
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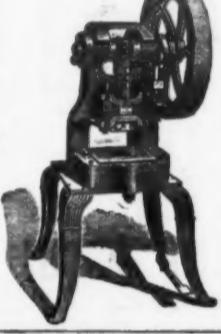
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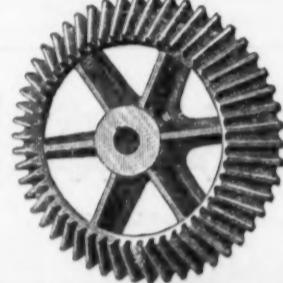
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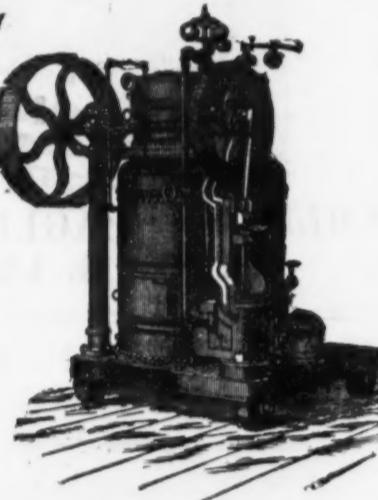
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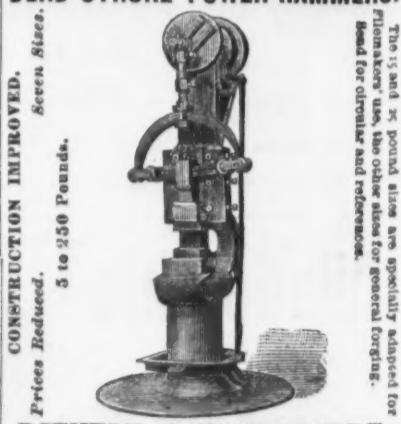
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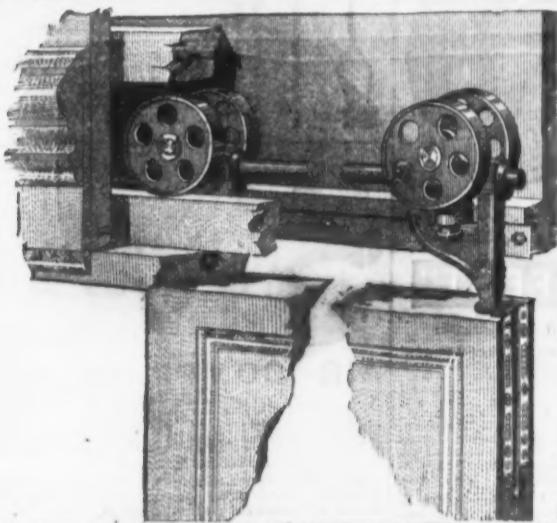
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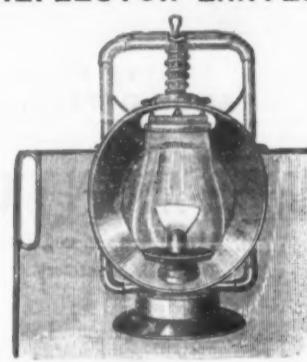
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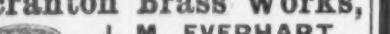
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